Refrigeration Service Engineer

VOL. 14 NO. 2 ★ ★ ★ FEBRUARY . 1946

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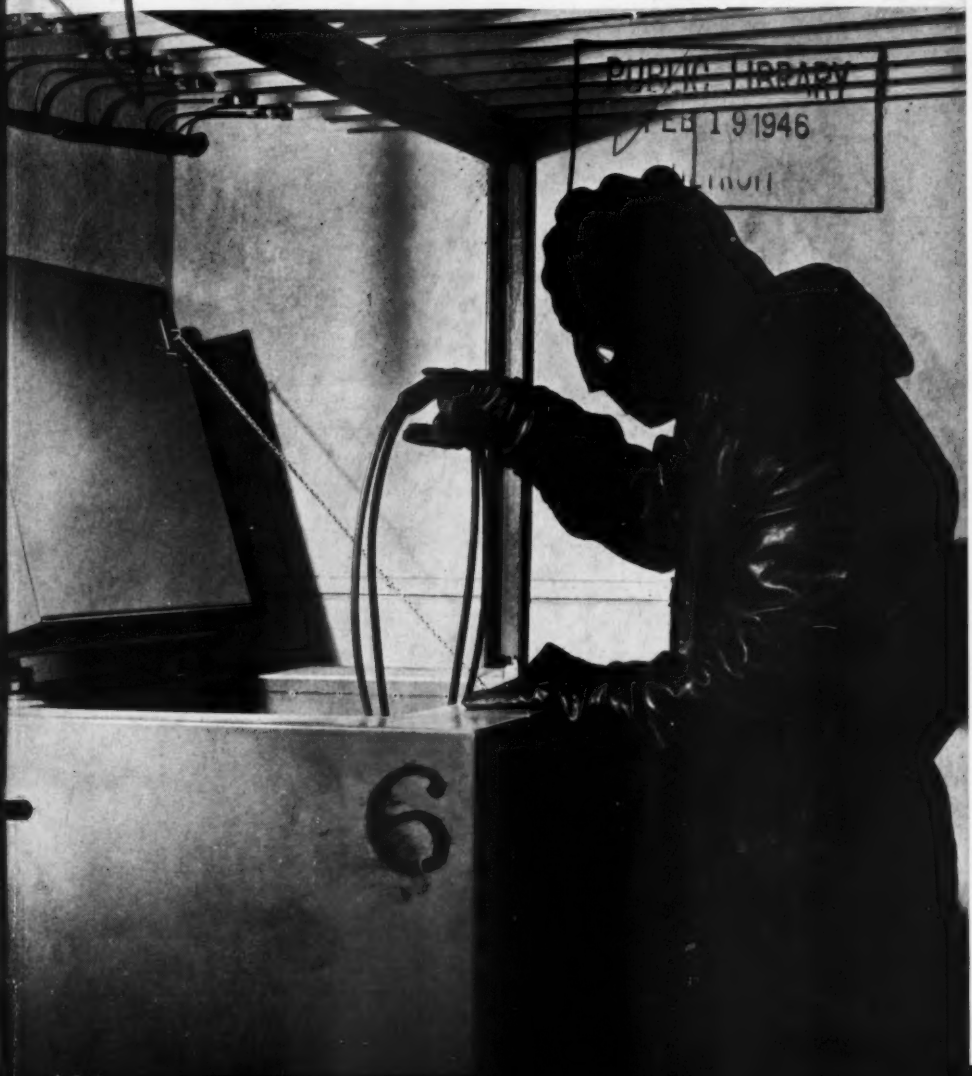


THERE'S ONE THING YOU SERVICE MEN ALL AGREE ON. YOU'RE GIVING THE *BEST SERVICE POSSIBLE* WHEN YOU INSTALL **CHICAGO SEALS**

CHICAGO VALVE PLATES

Save time and work, too. Only refrigerator compressor valve plates with removable valve seats. Sizes for most compressors.

CHICACO GENERAL REPLACEMENT SEALS

Go on refrigerator compressors in less time, with less work, and cut down "call backs."

MODERN DESIGN

SOLD BY JOBBERS

CHICAGO SEAL CO.

20 NORTH WACKER DRIVE • CHICAGO 6, ILL.

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago, 44, Ill. Published monthly. Vol. 14 No. 2, February 1946. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 per year.

The Ansul Research Staff
REPORTS ON . . . . .

WAX IN OIL-REFRIGERANT MIXTURES

WAX CAUSES FROZEN VALVES *too!*

These photographs show the results of practical machine tests in which 10% oil was circulated with the refrigerant. Valve temperature was approximately −25 degrees Fahrenheit. Every effort was made to exclude moisture. Within a few hours wax separated throughout the body of the expansion valve and the forepart of the expansion coil adhering firmly to the metal.

* Ansul jobbers are ready and equipped to render an intelligent, co-operative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

FOR EXAMPLE:

Samples of ice machine oils submitted by users of Ansul Refrigerants to Ansul Jobbers, are tested by Ansul laboratories without charge by the Ansul Standard Wax-Oil Separation Method. This approved method, developed and standardized especially for use in connection with oils used in refrigerating systems, provides an accurate determination of the amount of wax which separates from an oil at low temperatures.

*REG. U.S. PAT. OFF

A wax deposit, about 1/8 inch thick, formed on the plate carrying the ball-valve enclosure and almost completely clogged the outlet of the expansion valve.

Wax deposited on the ball-valve closure plate

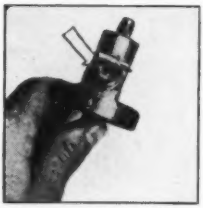
REMEDIES

To eliminate wax trouble in expansion valves and coils:

*

1. Use an oil which separates little or no wax from its mixture with the refrigerant at the operating temperature of the valve.

2. Install an oil trap to cut down the amount of oil (and consequent wax) circulating with the refrigerant.



Wax deposited in outlet of expansion valve

SEND FOR THIS BULLETIN

An informative reprint, "THE SEPARATION OF WAX FROM OIL-REFRIGERANT MIXTURES," will be sent on request. No obligation. Just address . . .

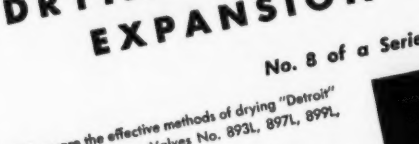
ANSUL CHEMICAL COMPANY
MARINETTE, WISCONSIN
DISTRIBUTORS FOR KINETIC'S "FREON-11," "FREON-12," "FREON-21," "FREON-22" AND "FREON-113"

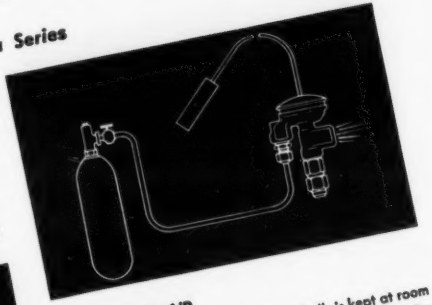
DRYING LIQUID CHARGED EXPANSION VALVES

No. 8 of a Series

Detailed here are the effective methods of drying "Detroit" Liquid Charged Expansion Valves No. 893L, 897L, 899L, 786L, 787L, and 788L.

When removing moisture from liquid charged valves extra precautions must be taken. A liquid charged valve has a large quantity of charging liquid in the power element. The feeler bulb will hold all the liquid in the power element assembly, and if the valve body is heated when the feeler



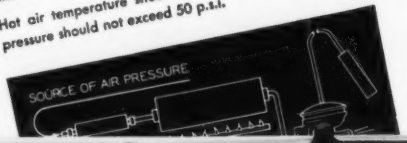


Space limitations prevent giving the full text of this service help on this page. The service bulletin illustrated here is complete. Write for your copy.

2. HOT DRY AIR

This method may be used if the feeler bulb is kept at room temperature or lower. Required is a source of air under pressure, a dehydrating cartridge, and a tank for heating the air. Blow hot air through the valve for about 30 minutes, until the valve is thoroughly warm. Cap or install the valve immediately to prevent entry of moisture from the atmosphere.

Hot air temperature should not exceed 160° F, and air pressure should not exceed 50 p.s.i.



WRITE FOR YOUR COPY OF THIS SERVICE HELP

This is the eighth of a series of service bulletins, published by Detroit Lubricator Company. They are printed on 8½" x 11" paper, punched for a standard loose leaf binder. Copies may be had on request. Write for yours.

Detroit "DURA-FRAM" Expansion Valves

MADE IN A COMPLETE RANGE OF CAPACITIES

There is a Detroit "Dura-Fram" Expansion Valve for any capacity from ½ ton to 20 tons Freon. Each does a better, smoother job—lasts longer—requires less attention. These valves are favorites of refrigeration men everywhere. Write for Catalog 200-A.

Capacity: 1.6 to 6 tons Freon; 3 to 21 tons methyl. Has external equalizer and forged union connections. Inlet and Outlet ⅜", ½" and ⅝" O.D. tubing. Flared nut for ⅜" tubing equalizer.

DETROIT LUBRICATOR COMPANY *General Offices:* 5900 TRUMBULL AVENUE DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

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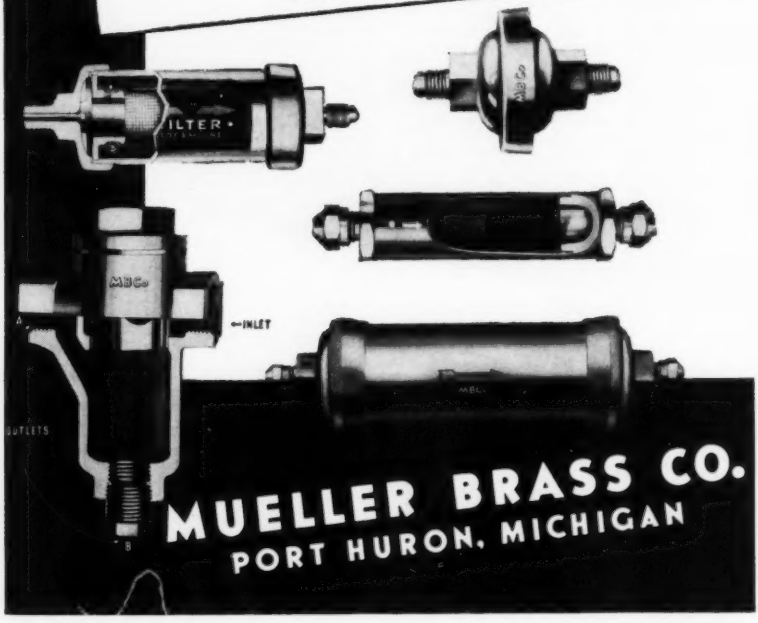
STRAINERS and FILTERS
for every need!

● Mueller Brass Co. Strainers and Filters are manufactured throughout with non-ferrous metal, and have a polished natural metal finish. All tubular types are fabricated from brass or copper pipe with forged brass outlets soldered in place. Other types are made from brass forgings.

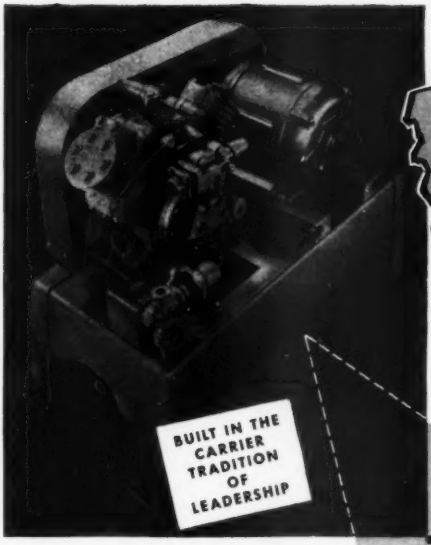
All Filters and Strainers are designed to insure efficient passage to the maximum refrigerant volume that is generally used in any particular size refrigerant line. The range is exceptionally complete—one for every specific purpose.

Write for literature on A-13661 Line Filter—inexpensive and with a maximum efficiency.

Order through your jobber



MUELLER BRASS CO.
PORT HURON, MICHIGAN



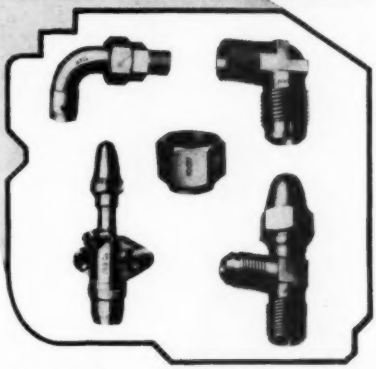
CARRIER
USES
MUELLER BRASS CO.
VALVES AND FITTINGS
IN THEIR CONDENSING UNITS

THESE PRODUCTS
MUST BE
GOOD!

CARRIER CORPORATION
SYRACUSE **NEW YORK**

● Condensing Units built by Carrier Corporation of Syracuse, N. Y. are designed primarily for Refrigeration and Air Conditioning duties that are the most severe services to which compressors can be put. For Air Conditioning, heavy loads of short duration with long stand-by periods require a unit with considerably more stamina than is ordinarily needed for continuous operation.

Using "Freon-12" as a refrigerant, these condensing units have a capacity range from 600 BTU to 1,100,000 BTU per hour. Available in air-cooled, water-cooled, or evaporative condenser types, this equipment finds application for controlling temperature and humidity in all types of businesses and industries. Restaurants, stores, residences, offices, hotels, markets, locker plants and commercial food freezing, storage vaults, farms, packing houses, water cooling, armament factories, marine and naval use, pharmaceutical and candy factories and process industries are but a few of the instances in which the Carrier line of condensing units has found wide-spread adoption.



BUILT-IN QUALITY . . .
TIME-TESTED PERFORMANCE

Mueller Brass Co. Valves, Fittings and Accessories for mechanical refrigeration have a well-earned reputation for built-in quality and time-tested performance. They are manufactured specifically for mechanical refrigeration work. THEY ARE USED BY ALL OF THE LARGEST MANUFACTURERS THROUGHOUT THE UNITED STATES. Mueller Brass Co. products must be good!

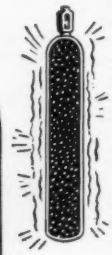
MUELLER BRASS CO.
PORT HURON, MICHIGAN

Service Engineers Should Know...

Why: Refrigerant cylinders should never be filled beyond their specific rated capacity.

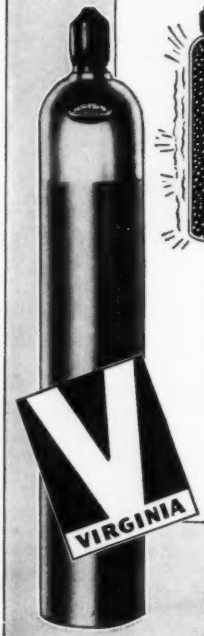
1. Cylinders of the same water capacity have a different maximum filling capacity for each refrigerant. For instance, a cylinder with a maximum capacity of 5 lb. of SO_2 must not contain more than 3½ lb. of Methyl Chloride. X-Rayed, a properly filled cylinder looks something like this:

2. The liquid must not completely fill the container when heated to 130° F. The liquid refriggerant will expand about 11% in volume during a temperature rise from 40° to 130° F.



3. If too much refrigerant is put into the cylinder, the liquid expanding under heat may fill the cylinder completely, causing powerful and dangerous hydrostatic pressures.

4. This is what happens when the hydrostatic pressure can no longer be contained — the cylinder explodes violently. Never overfill cylinders; it is dangerous!



Here is a simple illustration of what happens from overfilling. A thermometer works perfectly until the mercury, expanding from heat, hits the top of the tube. And then, pouf! Play safe — don't overfill cylinders!

Manufacturers of
"Virginia" Refrigerants and Distributors for Kinetic's "Freon 11"—"Freon 12"—"Freon 21"—"Freon 22"—"Freon 113"

VIRGINIA Smelting Co.

WEST NORFOLK, VIRGINIA
76 BEAVER ST., NEW YORK 5 :-: 131 STATE ST., BOSTON 4

This Groove Makes the Difference

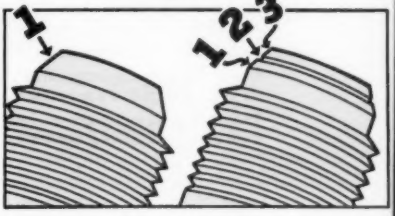
Gives You Joints with Triple-Seal Tightness

This groove in Imperial Triple-Seal Flare Fittings brings you triple-seal tightness in every joint . . . an extra protection against leakage.

When the flare is drawn against this groove, the copper tubing is extruded into the groove making a tight, self-sealing joint. Here is the joint that remains leakproof even though the face of the seat may be nicked or marred.

This extra seal of safety is a *plus* feature given to you only by Imperial Triple-Seal Fittings—added to the same excellent S.A.E. refrigeration type flare fitting you have previously used. And remember, Imperial Triple-Seal Fittings cost you no more!

Order Imperial from your Jobber.



(Left) Ordinary flare fittings have only one seal.

(Right) IMPERIAL TRIPLE-SEAL FLARE FITTINGS have three seals to give you new, extra protection against leakage.

THE IMPERIAL BRASS MFG. COMPANY, 534 South Racine Avenue, Chicago 7, Illinois

IMPERIAL

FITTINGS • VALVES • DEHYDRATORS • FILTERS • FLOATS • CHARGING LINES
TOOLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF AND SWEDGING

Brunner Refrigeration helps you serve better

IF HEAD OR DISCHARGE PRESSURE IS TOO HIGH

The Brunner Refrigeration Service Manual gives the following possible causes and remedies:

PROBABLE CAUSE	TEST and REMEDY
Overcharge:	Purge.
Air in system:	Purge.
Insufficient ventilation:	Relocate unit with proper air circulation over condenser.
Dust in condenser:	Clean condenser.
Dirty or clogged water passages in condenser or water valve:	Clean tubes and open water valve and clean.
Water not turned on:	Turn on water.
Operating with higher suction pressure than unit rating; i. e. operating low temperature unit on medium temperature service:	Change motor pulley and operate compressor at slower speed.
Evaporative condenser water or fan pump stopped, or make up water float stuck shut, or clogged water strainer:	Check motor circuits. Free float and clean strainer. See if fan belts are broken or slipping—replace or adjust.
Evaporative condenser tubes dirty:	Clean tubes.
Cooling tower pump motor stalled or off, clogged water strainer:	Check motor circuit. Clean strainer.
Insufficient evaporative condenser capacity or cooling tower capacity:	May be caused by extremely high atmospheric wet bulb conditions, beyond designed conditions. Increase fan capacity or supplement with additional water cooled, air cooled, or evaporatively cooled surface.

SERVICE essentials are common to all refrigeration systems. In the Brunner Refrigeration Service Manual, fundamentals, such as the above, are emphasized, so that no matter what minor difficulties there may be in various refrigeration systems, the basic installation and maintenance advice given will still apply. Therefore, make use of your Brunner Manual when trouble-shooting. If you do not have a copy we will be glad to furnish one for only $2.50. Write to

BRUNNER

BRUNNER MANUFACTURING CO., UTICA 1, N.Y., U.S.A.

For
PEAK PERFORMANCE
On All Refrigeration Installations . . .

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SPORLAN "Z" CHARGE FOR SUCTION TEMPERATURES Below ZERO

Your Sporlan wholesaler stocks the full line of Thermostatic Expansion Valves with Selective Charges to meet any operating conditions. Always consult with him before ordering and be assured of peak performance on all installations.

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SOLENOID VALVES
SOLENOID PILOT CONTROLS
MODULATING PILOT CONTROLS
REFRIGERANT DISTRIBUTORS
and the only
THERMOSTATIC EXPANSION VALVES
with SELECTIVE CHARGES

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3723 COMMONWEALTH AVENUE
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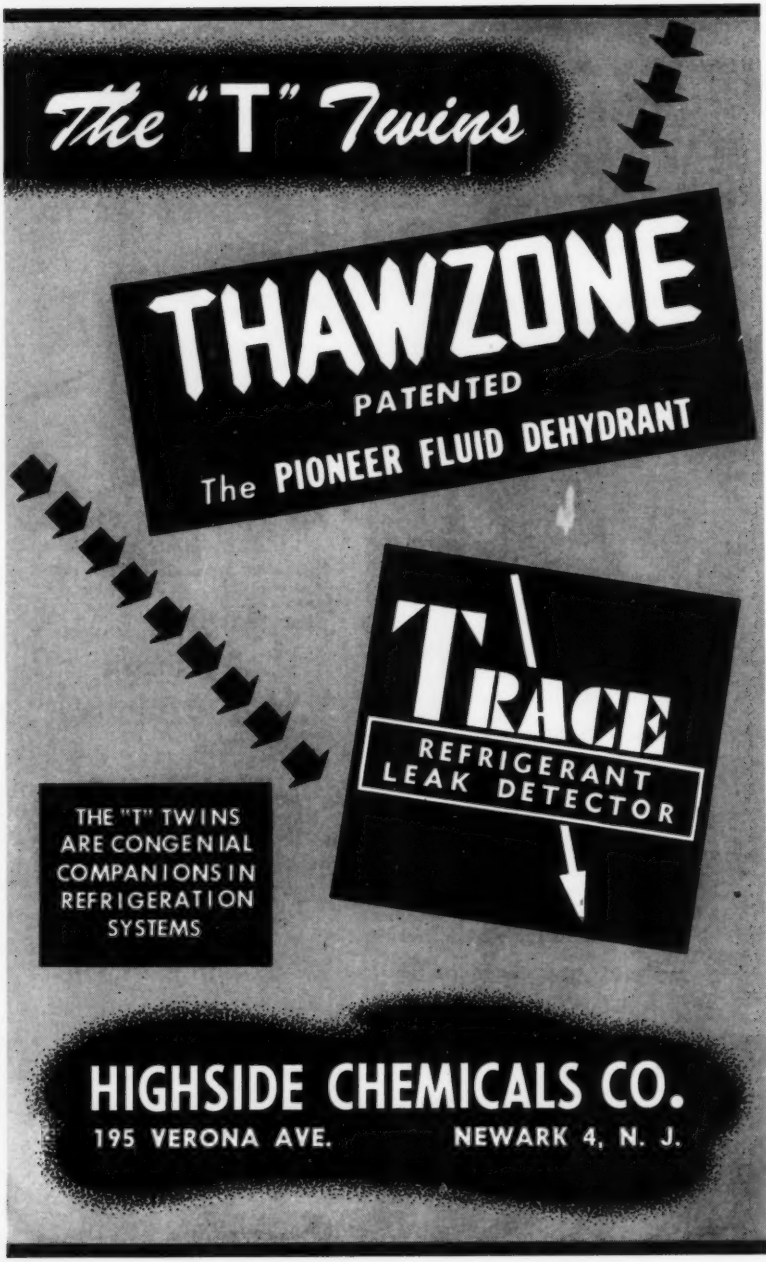
The "T" Twins
THAWZONE
PATENTED
The PIONEER FLUID DEHYDRANT
TRACE
REFRIGERANT
LEAK DETECTOR
THE "T" TWINS
ARE CONGENIAL
COMPANIONS IN
REFRIGERATION
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Pardon us for shouting, but we want the entire refrigeration industry to know that PEERLESS products are now being delivered far and wide. PEERLESS Flash Coolers, Ice Cube Makers, Fin Coils, and Off-Center Coils, shown below, are all being shipped to customers. And so are PEERLESS Capacity Boosters and Expansion Valves. PEERLESS is in production, a production made doubly efficient by new equipment and methods acquired during wartime. More than ever, you can depend upon the superiority of PEERLESS products.
Sold through leading refrigeration supply jobbers. Write for detailed information on products in which you are interested.
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ICE CUBE MAKER
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FLASH COOLER
PEERLESS OF AMERICA, INC.
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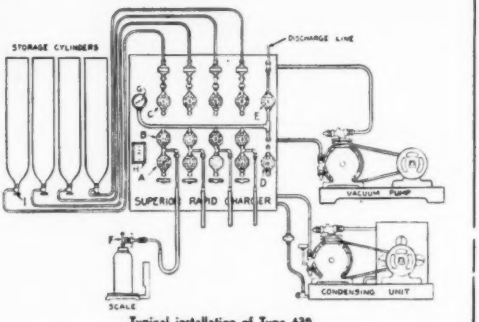
TYPE 630

Superior RAPID-CHARGERS

. . . Hi-speed refrigerant transfer systems
. . . five pounds per minute by actual test.

TYPE 630—illustrated above, is a complete refrigerant transfer system, with all equipment mounted on a special composition panel.

TYPE 631—illustrated below, is recommended for use where evacuation and discharge, and other facilities provided on Type 630 are not required.

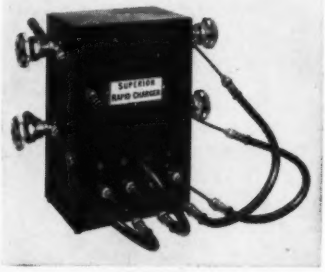


Typical installation of Type 630

RAPID-CHARGER is the result of careful study of all known refrigerant transfer methods, systems and problems pertaining thereto. It has instantaneous liquid coolers—one for each refrigerant to be transferred—connected in series with a refrigerating circuit, using a thermostatic expansion valve, and a small condensing unit with pressure control.

RAPID-CHARGER is fast—no valuable time lost in filling cylinders—no purging necessary. Refrigerant losses are practically eliminated.

If you haven't a copy of Catalog R2, request one today.



TYPE 631

No. 124

SUPERIOR VALVE & FITTINGS COMPANY

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A completely new sales-minded policy governs the merchandising of Kelvinator Condensing Units. Greatly increased facilities . . . new production methods developed for victory . . . concentration of production on a compact line to meet the requirements of the majority of commercial condensing unit buyers . . . are the factors which make this possible—and which make it possible to say that Kelvinator's trouble-free performance is now available *at competitive prices.*

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Detroit

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BUY KELVINATOR FOR YOUR COMMERCIAL REFRIGERATION REQUIREMENTS

Kelvinator **CONDENSING UNITS** OPEN AND SEALED

Balanced Performance

1 + 1 = 2
1 + 2 = 3
JUST SIMPLE ARITHMETIC

It takes "Just Simple Arithmetic" to figure out why that . . . by Comparison, they're buying PAR

PAR BY Lynch

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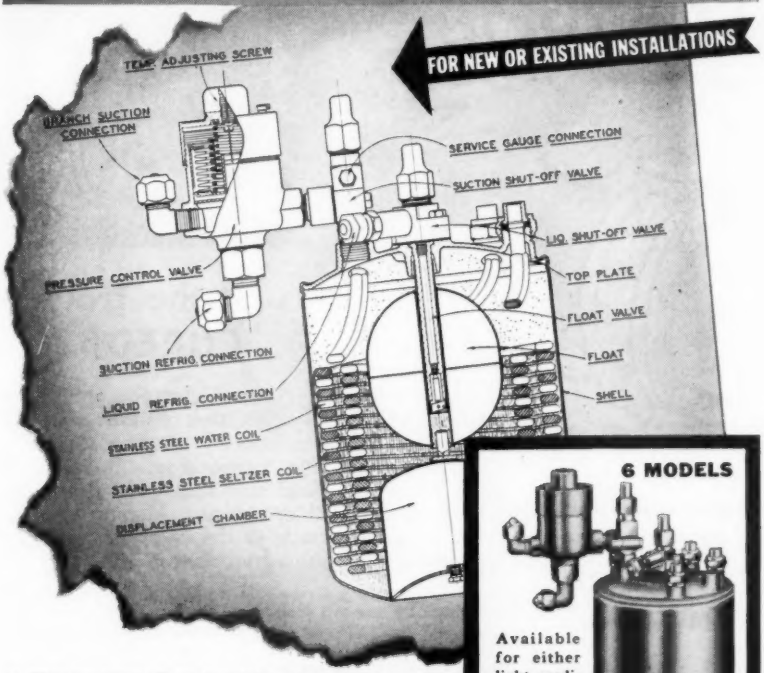
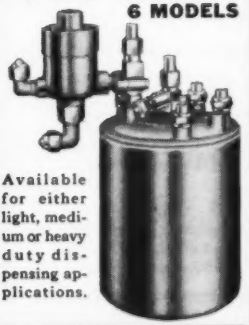
WITH TEMPRITE
SODA FOUNTAIN and BEVERAGE COOLERS

FOR NEW OR EXISTING INSTALLATIONS



6 MODELS



Available for either light, medium or heavy duty dispensing applications.

● When you install a Temprite soda fountain or beverage cooler you can be sure of a constant 40 deg. temperature with Temprite's patented instantaneous cooling principle and constant pressure control valve. The beverage is cooled as used and *only* at the rate required. Can handle either 1, 2 or 3 carbonated or non-carbonated beverages in each cooler. Write for descriptive literature today

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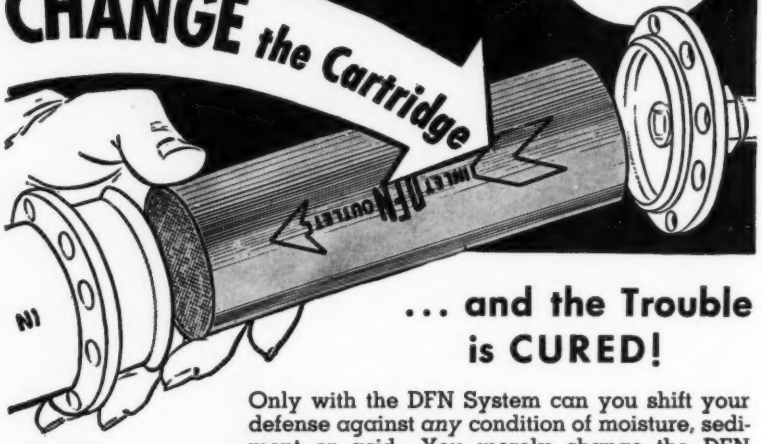
SPOT the Problem

MOISTURE
SEDIMENT
ACID

CHANGE the Cartridge



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Only with the DFN System can you shift your defense against *any* condition of moisture, sediment or acid. You merely change the DFN Cartridge according to requirements, such as High Moisture—Acid and Moisture—Sediment and Sludge—Sediment and Moisture—Sediment . . . then back to the normal Cartridge for continued trouble-free operation.

The DFN System is serviced faster, too. Every cartridge is mechanically packed, hermetically sealed, ready for use when wanted. You simply unbolt the permanent flanged shell, interchange cartridges and re-bolt. For complete information on this low-cost protection, ask your distributor or write us direct. *Catalog R-7 on request.*

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Bronze

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FILTERS
NEUTRALIZES

DEHYDRATORS • STRAINERS FILTERS • NEUTRALIZERS

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Removes Water Scale
From
Condenser Coils
Unit Coolers • Spray Heads
Compressor Jackets
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Water Fountain Coils
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Valve Plates

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Write for Literature or Refer to Your Local Jobber

SKASOL CORPORATION

WEBSTER GROVES 19, MISSOURI

Welcome Back, Chums...

Many Controls Not Manufactured During The War Now Being Produced

During the war there were a number of Ranco Controls that, of necessity, had to be discontinued, but now they are back in production again.

You will find the old friends back on your jobber's shelves together with many others that go to make up Ranco's complete line of pressure, air temperature and refrigeration controls—for commercial and domestic, general and exact replacement.

Your jobber has the new list of Ranco Controls

Ranco Inc.

COLUMBUS 1, OHIO

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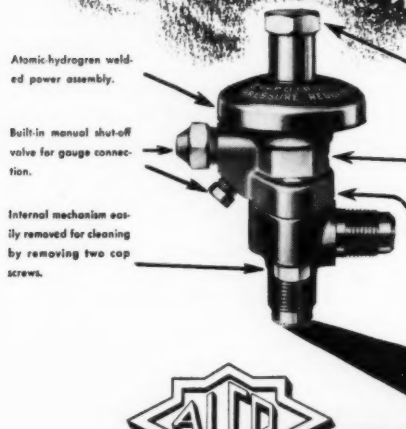

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IN THIS ISSUE—

Low temperature Refrigeration in general and a few specific installations are discussed, starting on Page 23, by F. R. Zumbro and Terry Mitchell. This is the first of a series of articles on the subject which will provide some worthwhile information.

Starting on Page 27, Donald F. Daly discusses the "Evolution of The Service Mechanic." Warning the service mechanic of the changes that are rapidly taking place in the field, he expresses the belief that the serviceman of tomorrow must be a better trained man with a wider knowledge of allied trades.

The second article of the series on Electric Instruments—Principles of Operation by G. F. Gardner, appears on page 29. The construction of the commonly used test instruments and how they operate is helpful information to the user.

The series of articles entitled "Refrigerants—Physical and Refrigerating Properties" by Guy R. King, is concluded in this issue. This month's article starts on page 32. It discusses some of the less commonly used refrigerants, providing enough information that a selection may be made in most applications.

How John C. McClaughlin is building up his company from a small service organization to a successful manufacturing, sales and service company in his community is told on page 36. This is another of those success stories which shows what can be done with the good will and clientele secured through field service.

The Service Pointers, appearing on pages 38 and 39, contain one item of interest to every man who may at some time service Copeland or Universal compressors. Symptoms produced by the clogging of suction port screens can be baffling at times and cause you to waste considerable time in locating.

In the Questions and Answers, starting on page 40, is a statement that Thawzone causes an increase in head pressures. This does not sound reasonable but the answer discusses the probable cause.

Building an Air Conditioning system for the Army at one of its outposts is quite a task, according to a letter received from L. E. Edwards, which appears on page 43. Having the modern shop pictured with the letter, however, makes it possible to salvage otherwise useless material.

THE COVER

A NEW cold room in which rubber and synthetic rubber compounds and products of many types, plastics and other materials can be tested at temperatures down to 90 degrees Fahrenheit (90 below zero) has been installed by The B. F. Goodrich Company at its Akron, Ohio, plants. Temperatures in the cold room can be varied from 50 above to 90 below Fahrenheit. In the front cover a piece of rubber tubing is being removed from one of the refrigerators in the cold room.

Thirty feet long, 15 feet wide, the cold room has five working units, each six feet square, cooled by a three stage compressor unit and a single stage compressor using Freon 12 and 22 as refrigerants. Each unit operates separately, with electrically controlled temperatures charted for a 24-hour study at different levels.

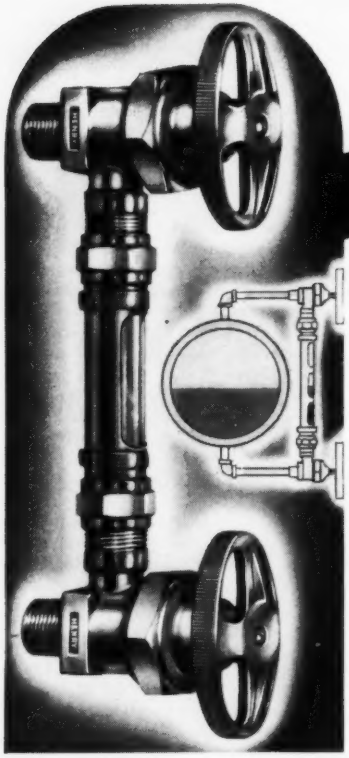
The new unit is large enough to permit tests of equipment under temperatures found in the colder parts of the United States and Canada, as well as those encountered in high altitude flying.

Capable of taking a load of 250 pounds of rubber, synthetic rubber or plastics, 500 pounds of steel or 100 pounds of oil, each unit is equipped with a door having a non-locking catch, and an alarm operated from within the unit as further protection against locking in the operator. All operators wear electrically heated clothing. Four of the units have temperature ranges from 50 above to 65 degrees below zero, while the fifth has a range from 50 to 90 below.

The cold unit has 16 inches of insulation on the sides and top and 19 inches next to the floor. The large entry room is provided with a Niagara No-Frost unit to absorb all moisture, making it unnecessary to defrost the cold room. Moisture is distilled off outside.

Vital necessity for careful testing of many rubber, plastic and metal products under extreme cold was emphasized during the war, when ground temperatures of —65 Fahrenheit were encountered in Siberia.

(Continued on page 26)



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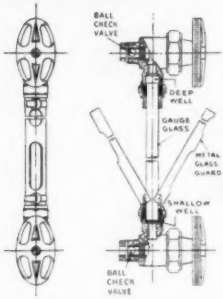

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Low-Temperature Refrigeration

BY F. R. ZUMBRO AND TERRY MITCHELL*

It is an interesting fact that the coldest temperatures recorded on the face of the globe are not found at the North or South Poles, but are said to be experienced in the region around Verkhoyansk, in Northern Siberia, where the temperature in the middle of the fashionable winter season may go down to minus 90 deg. F.—Author.

IF WE make a "thermometer" showing typical temperatures used in refrigerating work as in Fig. 1, it will be seen that the field of activity can be divided into three parts. Temperatures between zero and plus 40 deg. F. have been used for so long that this may be considered the standard refrigerating range. The greatest fields for future development are undoubtedly in the regions above 45 deg. F. and below zero F. At the moment we might define the low-temperature refrigeration field as beginning with minus 20 deg., where it first becomes worth while to use two-stage compression, and continuing through minus 120 deg., which is as far as ordinary commercial practice now generally extends.

If the compression ratio is around 8 to 1 or more, it usually pays to install a two-stage system, depending of course upon the size of the installation and the type of refrigeration. Where the temperatures go down still lower, three stages are preferably used, with float and electric control valves and liquid-and-gas coolers between each stage. The liquid is also cooled in stages.

One of the largest 3-stage systems in the country is installed at the All-weather Laboratory shown in Fig. 3. The job comprises a large high-temperature room, a huge stratosphere tunnel nearly 50 feet long, and the small test box at right. The fan in the tunnel circulates 100,000 cubic feet of air per minute over the finned coils, which are kept flooded by liquid ammonia with a pump. A large suction accumulator, placed beneath the coils, serves as a reservoir for the cold liquid and prevents slugging over into the suction line. The main suction pipe to the four-cylinder booster compressors is of 12 in. dia. The first-stage boosters have cylinders 15 in. by 10 in., and are driven at 360 rpm. by 75-hp. motors. Each 4-cylinder machine is rated at 19 tons refrigeration when carrying a suction pressure of 23 in. vacuum and discharging at 10 in. vacuum.

The two second-stage machines are 11½ by 8 compressors, each with two cylinders, driven at 400 rpm by 60-hp. motors. These machines discharge at 40 lb. gauge pressure

Pictured here is nature's most dramatic example of low-temperature refrigeration. While extinct for perhaps tens of thousands of years, the bodies of prehistoric mammoths continue to be found in the icebergs and frozen swamps of Siberia. The Russian Government was lately reported to be bringing one of these frozen mammoths, preserved by suitable refrigeration, to Leningrad.

*Frick Company, Waynesboro, Pennsylvania

into a pair of 7 by 7's, which form the third or high stage. They are driven at 400 rpm. by 40-hp. motors, making the total connected horsepower 350. Two small shell condensers keep the final head pressure at 170 gauge.

The first-stage machines handle 13.1 lb. of ammonia per minute, equivalent to 1173 cu. ft. The second-stage machines handle 16.2 lb. per minute, or 465 cu. ft. of gas actually pumped. The third stage has 22.54 lb. in circulation per minute, or 182 cu. ft. The steady increase in poundage results from the cooling of the gas and liquid between the stages. Being a test chamber, the tunnel is arranged to hold automatically any temperature between plus 100 deg. F. and minus 70 deg. F. Direct-expansion cooling jackets are used on the machines of both the first and second stages. The ammonia liquid pump handles 10 gpm., which at minus 75 deg. F. corresponds to about 60 lb. per minute, or nearly 5 to 1 when measured by the load requirements. A separate 3-stage set of compressors cools the small low-temperature test box at the right. A 4 by 4 machine is used for pump-out service.

Ammonia was selected for this war-time job for several reasons: plenty of ammonia was readily obtainable; it was inexpensive, and losses from the charge would likely be small. As the low side operates at a vacuum there is very little danger to personnel from leakage. Manufacturers and operators are so familiar with ammonia equipment that special problems were minimized. It works well in stages, does not carry any appreciable amount of oil over, and parallel operation of machines is easy. Friction losses in the pipe lines are low.

Freon-12 and Freon-22 have lately come into use for low-temperature work, and operate at a higher suction pressure on the first-stage machine than ammonia. In this diagram the coldest temperature produced is minus 100 deg. F., giving a suction pressure in the first-stage machine of over 2⅓ lb. absolute. This represents a rather low vacuum: ammonia would hardly be useable at this low temperature.

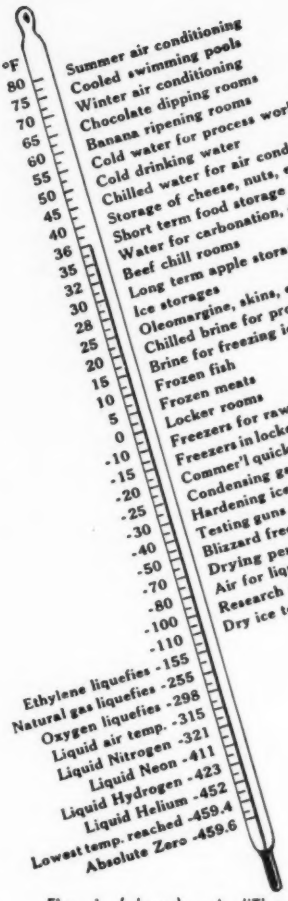


Fig. 1 (above) — A "Thermometer" showing typical kinds of refrigerating work performed at various temperature levels.

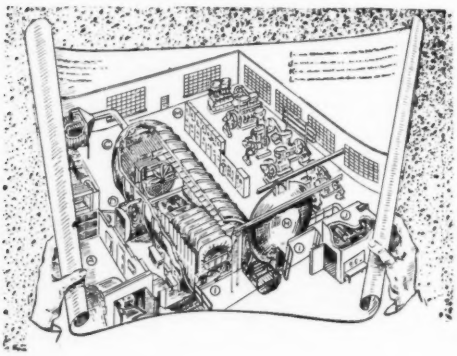


Fig. 3 (left)—All-weather Laboratory built for the United States Army, having 10 refrigerating machines and producing temperatures down to minus 70 deg. F.

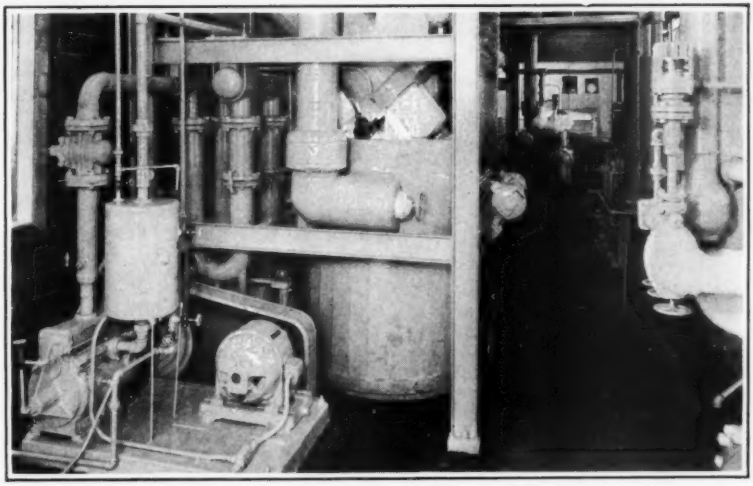
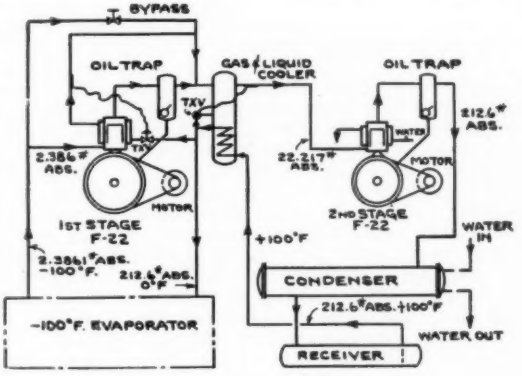


Fig. 2—Temperatures of minus 40 to minus 80 deg. F. are used in drying penicillin under an extremely high vacuum; frozen moisture is collected in the drum shown in the center.

An oil return trap was used in the discharge from each compressor. On all except the smallest jobs, the jacket of the first-stage compressor should be cooled with direct-expansion refrigerant. The liquid refrigerant in this case is chilled from a temperature of say plus 100 deg. F. in the cooler shown at the center. Freon-12 is a comparatively new refrigerant, but one that works well in very low-temperature applications.

At minus 107 deg. F., in a 2-stage system, it shows a volumetric efficiency of 48.6 per cent at a compression ratio in the first stage of 6.3. (Superheat, about 70 deg.)

Pennsylvania State College uses the low-temperature box illustrated in Fig. 5 for quick-freezing tests with meats and other foods. The box measures 6½ ft. by 4 ft. by 7 ft., outside, and is insulated with 8 inches of corkboard. A bank of double nested coils occupies nearly half of the interior space at the left; the doors open to a space filled with staggered shelves for blast-air freezing, with a squirrel cage fan and motor at the top; a small brine tank and pump are used for immersion freezing tests. This box has been cooled to temperatures as low as minus 50 deg. F. and the brine may go down to minus 35. The brine pump, of 5 gal. capacity, circulates the brine over the coils in the tank, under thermostatic control. A two-stage Freon-12 system carries the load. A heat exchanger precools the liquid before it reaches the electric control and thermostatic expansion valves which feed the coils. The main cooling coils operate at a



FLOW DIAGRAM – 2-STAGE FREON-22 SYSTEM

Fig. 4—Arrangement of a typical two-stage system, showing temperatures and pressures encountered at various points.

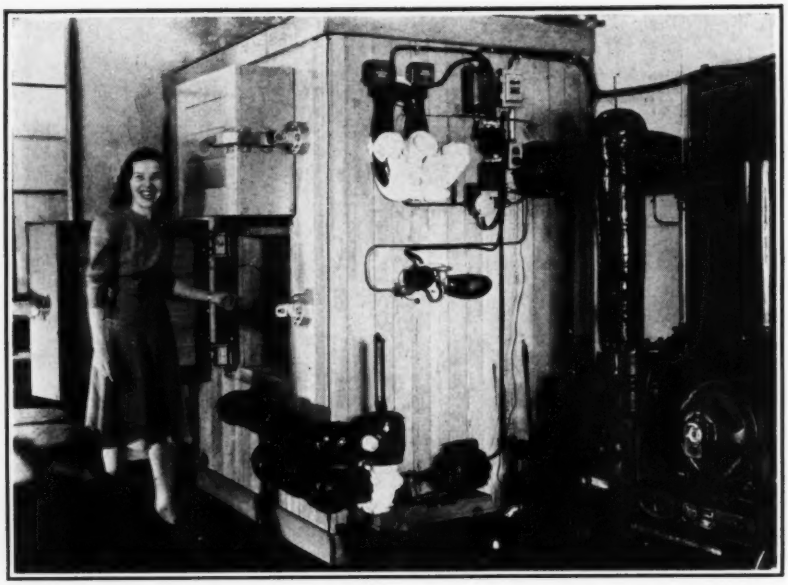


Fig. 5—Experimental box with two-stage Freon-12 system, producing temperatures of minus 40 to minus 50 deg. F. at Pennsylvania State College.

suction pressure of 5.6 lb. absolute; intermediate pressure is 20 lb. and the condensing pressure 139. A bypass makes it possible to cut out the first-stage machine if desired.

(To Be Continued)

THE COVER

(Continued from page 21)

Many rubber parts of airplanes had to meet the exacting requirements of these low temperatures where failure would have meant loss of life and equipment. These include carburetor diaphragms, accumulators, air valves, De-Icers, fuel cells, hydraulic and gasoline hose, fuel and hydraulic seals, expander tube brakes, tires and many others.

Automotive parts and other equipment which had to withstand this extreme cold included automotive fuel and oil hose, radiator and heater hose, motor supports, windshield wiper tubing, bushings, gaskets and seals, railroad air brake and signal hose, fire hose, Vibro-insulators and belting.

B. F. Goodrich was a leader in the program of testing rubber parts for this program during the war, because the problem had been presented to it some years before.

Company research on the effect of severe cold on rubber products, dates back to the winter of 1933-34 when hydraulic brakes on some cars in northwestern United States and Canada would not operate after they had been outside several hours. Examination disclosed that the rubber cups, normally flexible and pliable became brittle and contracted the sealing edges until they were smaller than the diameter of the cylinder they were intended to seal, no longer exerting the necessary pressure. New compounds which would work satisfactorily at 40 below had to be created.

First efforts to test effects of low temperatures on rubber compounds was immersion of samples in cups of alcohol cooled by dry ice. This was soon discarded, however, because temperatures could not be readily and accurately controlled, and because of the solvent effect of the alcohol on the compounds. The first refrigeration room was then created.

The new unit is thus the latest development of the company's research on testing under extreme cold, with the lessons learned over many years incorporated in its design and methods.

The Evolution of

A SERVICE MECHANIC

By DONALD F. DALY

I AM afraid that few of us realize the change that is going to take place in the work of the refrigeration service man. The service business as it has been in the past, and as it exists at the present time is undergoing what amounts to a revolution. With the advent of new equipment that will soon be on the market and the trend toward replacing high pressure refrigeration plants with those using low pressure refrigerants—the refrigeration service field as we know it may be due for some drastic changes. This is of the utmost importance to the refrigeration mechanic and should be thoroughly understood. It means that different skills and a higher order of efficiency will be required. It means that the refrigeration mechanic will truly have to be a Refrigeration Service Engineer with all of the training and technical knowledge that the title implies.

Sealed Units Increasing

In domestic and small commercial service field as we have always known it, the trend is toward sealed units which cannot be serviced in the field. In a very short time all domestic machines and most small commercial equipment will have sealed units. This means that the work done in the field will be cut to a minimum. Most of the work on these units will be done in large well equipped shops by specially trained mechanics. And the work once open to basement operators and poorly equipped shops will diminish and gradually disappear. Another source which supplied much of the work once done by these men will disappear even faster. That is the work that was done on the open type belt driven units many of which are due for replacement. This means a great decrease in the amount of work that was once open to the man with no more than a car and a kit of tools. The change over in the small commercial field will be somewhat slower but just as sure.

There are many other factors to be considered. Service has gone big business. It is no longer a small and unwelcome offshoot of a sales business. Just recently I read of a service business being organized in Los Angeles with a capital of $75,000. This is indeed big business for a service shop. It means that this operator will be able to equip a shop capable of handling any job large or small.

Improved Service Needed

He will be able to use production line methods, pay top wages, and hire only the best mechanics. It means competition for the small operator in the larger cities and will sooner or later force him to evaluate his present business operation. With this evolution in the business, it means that the customer will get high quality service at reasonable prices, which hasn't always been the case in the past. When the public becomes educated to expect high quality service at reasonable prices, it is going to be very difficult for the unreliable operator with limited capital and equipment, and frequently, poorly trained mechanics, to compete with the new modern service organization now in its transition period. And it looks as though at long last refrigeration service is going to come of age, and be recognized for what it is; a very necessary and important part of the refrigeration industry. The refrigeration service organization should play the same part in the refrigeration industry that the modern garage plays in the automotive industry. Therefore, it would be wise at this time for the average mechanic and independent operator to examine his position and see how it stacks up against these new conditions.

Certainly there is no ground for pessimistic thinking. On the contrary I believe there is every reason for considerable optimism. In the new field for refrigeration service men that is opening up now there

will be good paying jobs and good working conditions for thousands of men. The only limitations to this field will be the ambition and qualifications of the individual. These jobs will require a higher degree of skill and a wider application of technical knowledge than has been required of refrigeration mechanics in the past. The operator in this field will have to have, not only a thorough understanding of refrigeration theory and practice, but some knowledge of several other important factors. He should be able to do, or supervise every operation from the moment the truck delivers the equipment to the job, until it is erected, tested, and turned over to the owner. This means that he will have to have some knowledge of rigging, pipefitting, electrical work, job planning, blueprint reading, etc. I do not mean that he will have to be master of all these crafts, but he will have to have some knowledge of them in order to be able to carry out his work efficiently.

More Training Needed

If this seems an imposing list of requirements do not be discouraged. I believe that it will be possible for a great number of the men now doing service work to make the change to this new type of work without too much hardship. It will not be necessary to be skilled in all of these things right at the start. There will have to be some "on the job" training, and the supervisor will have to bear the brunt of the responsibility at the start. But the sooner a man becomes qualified in all of these operations, the sooner he will be eligible for a better paid and more responsible position. I believe that a great many of the better qualified men now doing service work have many, if not all, of the skills required to do this more exacting type of work.

In order to properly evaluate a man's qualifications, it might be well to examine the process by which he became a refrigeration mechanic. The refrigeration industry has lacked a broad training program. Some of the larger manufacturers have trained men to supervise the installation of their commercial equipment as well as domestic equipment. These programs usually covered only the barest essentials and could never, under any circumstances, develop a man into an all around mechanic. A few men did by much study, hard work, and grief, learn to handle more difficult jobs, but in most cases they were content to specialize on the machines of one manufacturer. As a consequence household service was not always desirable from a competitive standpoint. There were too many inexperienced men in this field. The result was that the public oftentimes received poor service at high prices.

Commercial Work Is Better

The commercial field was somewhat better, but not much. Competition was tough and the work was seasonal. Many good men entered refrigeration work from some other craft such as steamfitters, machinists, electricians, etc. Men already skilled in a kindred craft could qualify as installation men in a comparatively short time. But the work could not hold them for long due to its seasonal nature.

Another means by which an untold number of men have been drawn into refrigeration service has been trade schools and correspondence courses. Thousands of men have taken such courses in the hope of immediately becoming skilled refrigeration mechanics or independent operators.

The reason so many of them have failed in their efforts, is the lack of recognition that their success is dependent upon their serving their apprenticeship in actual shop and field work under the capable supervision of an experienced refrigeration service engineer. It is not a smooth road, but no worthwhile vocation is easily secured.

The refrigeration service business is a specialized field and its future depends upon attracting the properly trained man who is ready to accept the responsibilities of tomorrow. The service business must be a strong, responsible part of the entire industry, otherwise all phases will suffer.

S S S

30,000 LOCKER PLANTS BY 1950

THE Department of Agriculture's 1945 count shows 6,464 frozen food locker plants in active operation throughout the country—the increase of 1,182 locker plants since 1944 being the most rapid in the department's records. Some authorities now go as far as to say that there may be as many as 30,000 locker plants in the country by 1950, but this figure may include frozen food lockers in apartment buildings and in conjunction with retail and other food stores, the installation of which is being pushed to provide facilities for residents of metropolitan areas.

ELECTRIC INSTRUMENTS

Principles of Operation

By G. F. GARDENER*

Alternating-Current Instruments Dynamometer Type

THE instruments just discussed measure direct-current quantities only, because the field supplied by the permanent magnet is unidirectional. If we should take off the permanent magnet and replace it with a coil of wire suitably arranged with respect to the moving coil, such as shown in Fig. 8, we could connect the fixed and moving coils in series. Then, by sending alternating current through the instrument, we could obtain a deflection which would bear a definite relation to the current being sent through the coil system. This happens, because, when the alternating current reverses, the polarity of the fixed and moving coils reverses at the same instant — and we obtain a pulsating torque which is always in the same direction. This illustrates the dynamometer principle.

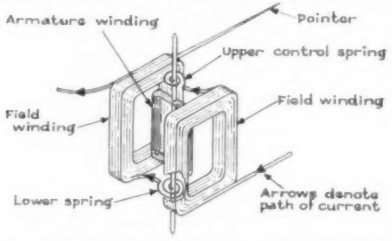


Fig. 8. Elementary diagram of dynamometer-type instrument

In actual practice, the shapes of the moving coils for alternating-current instruments are different from the moving-coil shapes used for direct current. Usually, these coils for a-c instruments are circular, as in Fig. 9, and so proportioned as to afford maximum efficiency. Even with this construction, alternating-current instruments require a larger amount of power for full-scale deflection. The current being measured must not only supply the energy for the moving coil, but must also supply energy for the field winding, which in the case of the permanent-magnet instrument was supplied by the magnet. Another important consideration is to keep any closed loops of wire or masses of metal well away from the fixed and moving coils. Such material would form a path in which current would be induced, and it would cause errors in the instrument indication when the instrument was used on alternating current. These induction troubles do not occur with direct current.

*General Engineering and Consulting Laboratory, General Electric Co., Schenectady, N. Y.

ARTICLE TWO

Familiarity with the construction and application of instruments is just as desirable as with other tools. In this series of articles the author discusses briefly the characteristics of instruments, what makes them operate, and the individual limitations of the various types.

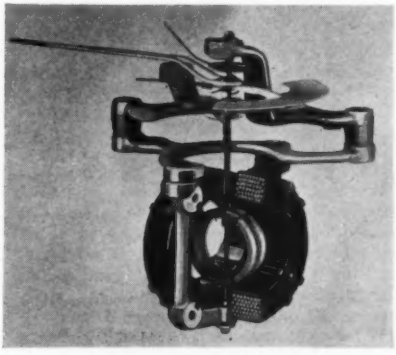


Fig. 9. Essential parts of a dynamometer instrument

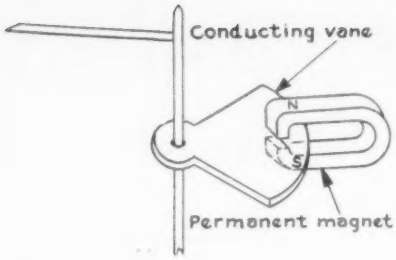


Fig. 10. Details of magnetic-damping mechanism

Damping

The instrument shown in Fig. 8 would have very objectionable characteristics, because, when we apply current, the pointer would oscillate back and forth a number of times before coming to rest. In other words, it would not be properly damped.

To obtain damping, two methods are in general use. One involves the use of a thin aluminum or copper vane which swings between the poles of a small permanent magnet. When the moving element deflects, a current is induced in the aluminum vane. The field produced by this current interacts with the field of the permanent magnet and tends to oppose the motion of the moving element, thus causing the system to come to rest quickly. The other method of obtaining damping involves the use of a closed box in which a vane swings in a restricted space. This method of damping is called air damping, while the method which uses the aluminum vane and permanent magnet is known as magnetic damping. Both methods are in common use, although it is considerably easier to obtain very high values of damping with the magnetic method. Air damping calls for the use of quite precise construction in respect to clearances and general workmanship.

In Fig. 10 and 11 are shown instrument-damping mechanisms of the magnetic and air types, respectively.

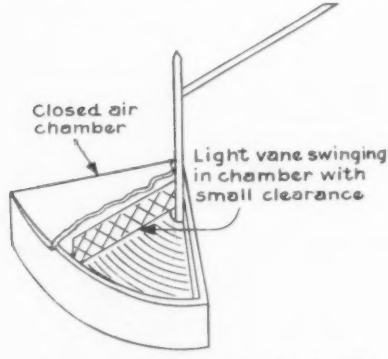

Closed air chamber
Light vane swinging in chamber with small clearance
When vane moves, motion tends to be opposed by constriction of air in chamber

Fig. 11. Details of air-damping mechanism

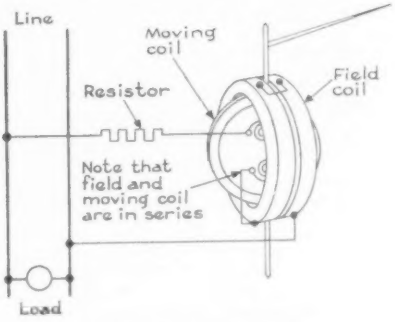


Fig. 12. Schematic view of a dynamometer element arranged to make a voltmeter

Voltmeters

If we take the dynamometer-type (alternating-current) milliammeter described in a preceding paragraph, and add suitable series resistance constructed of zero-temperature-coefficient material, as shown in Fig. 12, we will have a voltmeter which can be used to measure a-c volts. Alternating-current voltmeters draw considerably more current from the line than d-c voltmeters. In fact it is not unusual to have a high-grade portable a-c voltmeter of 150-volt rating require as much as 75 milliamperes for full-scale deflection. This gives an instrument resistance of approximately 2000 ohms, and a full-scale power consumption of about 11 watts.

Here we come to an interesting point. The series resistor of Fig. 12 contributes nothing to the torque of the instrument, since torque is governed by the product of the ampere-turns of the fixed and moving coils. If we could wind the fixed and moving coils entirely of resistance wire, we could dispense with the fixed resistor normally used. This,

however, is not practical, because of the large amount of power which would then have to be dissipated by the coil system. To obviate this difficulty, we wind the fixed and moving coils with copper wire. Then, to reduce the instrument error caused by change in the resistance of copper when the temperature is varied, we mask or "swamp out" the error by using sufficient series resistance of negligible temperature coefficient. It has been found that a satisfactory relation between copper resistance and swamping resistance exists when the copper resistance amounts to about 10 per cent of the total resistance of the instrument. In other words, in our 150-volt portable instrument previously described, the field and moving coils would have a combined resistance of about 200 ohms, and the series resistance would be approximately 1800 ohms, making a total of 2000 ohms.

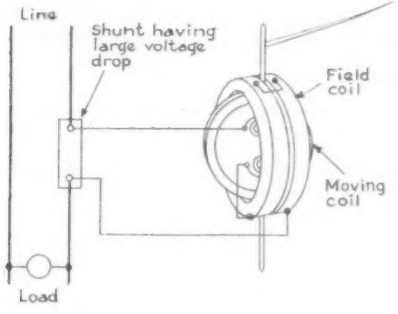


Fig. 13. One way to make a dynamometer ammeter to measure several amperes

If the full-scale voltage rating of the instrument is lowered, the resistance of the instrument, of course, must decrease. Also it is necessary to keep the copper resistance at about the same proportion, namely, 10 per cent. This limits the number of turns which we are able to wind on the fixed and moving coils. Hence, to get the same torque in the instrument, we must use more current, which means that the instrument may draw a very appreciable current from the line. For example, a 15-volt a-c instrument of the higher-grade portable type may draw as much as 250 milliamperes from the line.

To illustrate the effect of increasing the percentage of copper resistance, we could make an instrument which would require less current for full-scale deflection by using smaller-size copper wire on the fixed and moving coils, and by increasing the number of turns. However, the performance of the instrument under various conditions of ambient temperature might be quite poor. Suppose that instead of using 10 per cent or 6 ohms of copper in a 15-volt, 60-ohm instrument, we used 30 ohms copper and 30 ohms zero-temperature-coefficient resistance. Copper changes 0.4 per cent for each degree C change in ambient temperature; thus, if the temperature at which the instrument is used were increased 10 degrees, the resistance of the copper circuit would increase to 31.2 ohms, giving an instrument resistance of 61.2 ohms at this temperature. This instrument would then read $\frac{60}{61.2}$ or only 98 per cent of the correct value when 15 volts were applied.

The foregoing assumption as to instrument indication does not take into account the change in elastic modulus of the instrument spring at this higher temperature. As a matter of fact, in most instruments the elastic properties of phosphor-bronze spring material change in such a direction as to compensate partly for the error in indication caused by change in the copper resistance of the instrument.

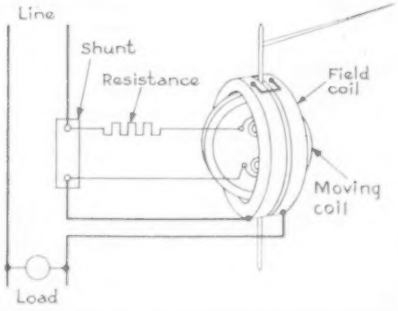


Fig. 14. A better way—the field coil carries all of the line current, and the moving coil carries a definite fraction of it

Ammeters

Instead of changing our milliammeter into a voltmeter by providing it with a series resistance, if we equipped it with a shunt, we could use it for measuring values of alternating current greater than 100 milliamperes. We would, however, run into some practical difficulties in applying this scheme if we used a shunt as shown in Fig. 13. The shunt would have to have a very high volt-

(Continued on page 37)

Refrigerants—

(Article Four)

Physical and Refrigerating Properties

By GUY R. KING*

Freon 22, F-22

THIS is a recently introduced Freon having volumetric characteristics similar to ammonia. It has a slightly greater volume per ton of refrigeration than ammonia at standard ton conditions. But at lower temperatures, the volume of Freon 22 becomes less than that of ammonia. Its condensing pressure is a little above that of ammonia, so it could cause difficulties if adequate, cold condensing water was not available. Its compressor discharge temperature is much lower than for ammonia. So particularly on low temperature jobs with a high compression ratio, it will not give lubrication problems associated with high ammonia discharge temperatures. Its freezing temperature is —256°. Its other characteristics such as non-toxic and non-inflammable properties, are similar to the other Freons.

Thus, it eliminates the disadvantages of toxicity and lubrication problems due to high discharge temperatures of ammonia. But it is in turn much more expensive, much harder to hold, and has a higher discharge pressure. It is only recommended for sub-zero refrigeration work, both in commercial and industrial sizes. It has definite advantages for such applications. These advantages become g r e a t e r as evaporator temperatures go lower. It will undoubtedly find increased use for such jobs. Just how far it will go, particularly in displacing ammonia even on low temperatures, time only will tell.

Carbon Dioxide

Traces of this gas are present in the atmosphere. It is found dissolved in the water of some wells. It is formed by burning any fuel containing carbon, as do most fuels. It is also the gaseous product given off during fermentation. Most of that produced commercially comes from fermentation or from flue gases. Charged water for drinks is ordinary water with this gas dissolved in it, either naturally or artificially. It is what gives the bite or tang to soda pop. Dry ice is frozen carbon dioxide.

This gas is colorless, odorless and non-toxic except in high concentrations. The liquid is colorless, but since the triple point is 60.4 pounds gage, no liquid can exist at atmospheric pressure. As shipped in steel drums, it may be either a liquid or gas depending on whether it is below its critical temperature of 87.8° or not.

The data in this series of articles, concluded with this issue, has been collected to give a complete comparison of common refrigerants. Sufficient data is given that an intelligent selection of the proper refrigerant could be made for the average job. It should give an operator handling a given refrigerant the most important points regarding its operating characteristics.

The volume of the vapor required to give a ton of refrigeration is the least of any refrigerant used. It gives 3.64 times the refrigeration per cubic foot of ammonia. But on checking the next item on the list, we find it requires a condensing pressure of 1024 pounds and an evaporator pressure of 320 pounds. These excessive pressures make the necessary compression equipment much more expensive than that of ammonia, even though the required displacement is so much less. Not only the compressor, but all equipment throughout the system must stand these high pressures.

The critical temperature of carbon dioxide is 87.8°. This leads to difficulties if the temperature of available condensing water is not well below this. Operation is possible when the condenser cannot be cooled below

* Instructor, San Francisco Chapter, N.A.P.R.E.

the critical temperature, but on a gas cycle which brings operating difficulties.

It is stable, has no effect on oil or metal, is not irritating, poisonous, or inflammable. Also, there is no breakdown in flame. Therefore it is completely safe.

Its cost is low. But there is no simple method of detecting leaks. A periodic check of all joints with soap suds and a dye in the system are the only checks possible, unless a leak gets so bad it can be heard. This, with its high pressure makes replacement costs higher than for other refrigerants, even though its cost per pound is least.

The power required to produce refrigeration with carbon dioxide is about 78% more than for other refrigerants. Naturally, this is another point against it.

It freezes at —69.9°, which would place limitations on its use for circulation in a low temperature system. However, use is made of this property in the manufacture of dry ice, which is frozen carbon dioxide.

Summary

To summarize, carbon dioxide has so many faults and limitations as a good refrigerant that it might seem surprising that it has been used to any great extent. But it is safe. Before the introduction of the Carrenes and Freons, it was the only safe refrigerant. Therefore, in applications where safety was of greater importance than whether it was the most economical or most convenient, it found widespread use. Due to the heavy compression equipment, and the power necessary to handle it, it has never been used in commercial sizes. But in industrial sizes it was at one time used almost exclusively in passenger ships, hospitals, around prisons and similar institutions, and in early air conditioning applications. Since 1935 such jobs have used one of the synthetic refrigerants which combine safety with better refrigeration properties. But there are still many previously installed carbon dioxide plants in operation, and probably will be for some time to come. It should not be forgotten that carbon dioxide compression equipment is required for the manufacture of dry ice. So new equipment is still required for this special application.

LESS COMMON REFRIGERANTS

Carrene

This was one of the first synthetic halides developed exclusively for refrigeration purposes. It was originally developed for centrifugal compressors, and was used exclusively in this country with the first centrifugal refrigeration compressors. This early development was devoted entirely to air conditioning work. It is similar to Carrene 2, but its pressure is lower. It was used by one manufacturer in a domestic system several years ago. A rotary compressor was used to handle the large volume required.

Methyl Formate

This was tried by one domestic manufacturer for a limited time. The principal argument for its use was that it was non-irritating and relatively less toxic than sulphur dioxide. But its other disadvantages, principally the fact that it was unstable and broke down, led to its being discontinued.

Ethyl Chloride

This is a refrigerant that is chemically very similar to methyl chloride. Its physical properties are also similar except that ethyl chloride operates at a much lower pressure, and therefore has a larger volume. It was used extensively in early experiments with domestic refrigerators. Its low pressure made it easy to handle in open containers. It could be poured into a system like pouring gasoline into an automobile. Rotary compressors were used to handle the volume required. One manufacturer even tried a two stage rotary compressor. It is even worse than methyl chloride in thinning oil and dissolving it out of bearings. One manufacturer successfully used this refrigerant with a rotary compressor for commercial systems long after it was abandoned in the domestic field.

Freon 21, Thermon, Zeon

These are all names under which this refrigerant is sold. Its principal use has been as a replacement refrigerant for Freon 114 mentioned below.

Freon 114, F-114

This is a low pressure Freon adopted exclusively by one domestic manufacturer. A rotary compressor is used to handle the large volume. It is only available through this manufacturer's exclusive service outlets.

Because of the difficulty in obtaining this refrigerant for service in the field, F 21 and others have been tried as a substitute.

Butane, Isobutane, Propane

Some experimental work has been done with these three hydrocarbons. Butane requires a vacuum in the evaporator, isobutane has a pressure similar to sulphur dioxide, and propane has a pressure similar to ammonia. Their main objections are that they are highly inflammable. Isobutane was used by one domestic manufacturer for several years.

An interesting application of all three of these is their use in truck refrigeration. The refrigerant is supplied to the truck in a tank in liquid form. This is expanded through an expansion valve to the pressure required for the desired temperature, and carried through evaporator coils in the truck body. Then it is brought to the truck motor where it is used as a fuel instead of gasoline. Thus, the fluid is used first as a refrigerant, then as a fuel. Obviously, no motor driven compressor would be necessary with such a system. But its success would depend on the truck being in operation all the time refrigeration is required.

Other Conditions Than Standard Ton

Standard ton conditions have been used for all comparisons which would be changed by a change of temperature. This is to give a fair comparison of each refrigerant with the others. On the whole the different refrigerants will change about the same for changing temperatures. There are a few cases where some properties which are nearly the same will change relative positions for higher or lower evaporator temperatures. Also note that conditions such as condenser and evaporator pressures, displacements, horsepower and compression temperatures will change greatly with changing temperatures. So what is marked good or fair for standard ton conditions might be poor for other widely varying conditions. And some items marked poor could be good at other conditions. Any more complete comparison would have to be worked out for the exact conditions prevailing. But the data given will still serve as a good comparison of systems operating under average conditions.

Changing Refrigerants

The question is sometimes asked, can the refrigerant in a system be changed without affecting the operation of that system? Someone gets gassed out with a sulphur dioxide or ammonia leak, and would like to have his system changed to a non-irritating refrigerant. During the recent shortages encountered in our all-out war efforts, Freon 12 was on the critical list, and was unobtainable without a high priority. Could the Freon 12 systems be changed to something else?

Before making any such changes, it is best to consult the manufacturer of the refrigeration system. He is best qualified to pass judgment on any changes contemplated. If manufacturers recommendations are lacking, the following points should be kept in mind.

1—The system will probably give maximum efficiency with the refrigerant it was designed for. Sizes of lines, ports and passages in the compressor, valve clearances, the pressure applied to the valve springs, are all designed to give the best possible results based on the volume and density of the fluid handled. A different refrigerant would have a different volume and density, so all the conditions so carefully designed for would be changed. It would be like having a suit tailored to an individual, then selling it to someone else. Even though it might fit approximately, it could never fit another person as well as the one it was tailored for.

The result in the case of the refrigerant is that the losses in the system, particularly in the compressor, are apt to be greater. In some cases they will be considerably greater. Sometimes manufacturers do design a compressor which they adapt to two or more refrigerants, with or without minor changes such as valve clearance and valve springs. Such compressors could be changed over with no ill effect if other factors are considered.

2—All refrigerants have different refrigerating effects for a given displacement. Therefore, if no other changes are made, there will be a variation in refrigerating capacity. This variation, neglecting losses mentioned above, will be proportional to the data given under item 9 of Table I and of the graphic illustration in Fig. 4, published in the November installment. If a change such as from Freon 12 to methyl chloride was made, the capacity would be reduced. This would reduce the load on the condenser and driving motor. But a change in the opposite direction would increase the capacity. This would overload the motor and the condenser. The overloaded condenser would raise the head pressure which would further overload the motor.

This variation in capacity is usually compensated for by changing the operating speed of the compressor. This is done by changing the size of the motor pulley. When the unit is to be slowed down, a smaller motor pulley is required. This sometimes leads to a pulley so small that the driving belts are flexed excessively around the smaller pulley, and their life is materially reduced.

3—Any change in refrigerant should naturally require the entire system be thoroughly cleaned. This includes draining and flushing out the compressor oil. The new oil must be suitable for the new refrigerant to be used.

4—Expansion valves or float valves should be exchanged or recalibrated for the new refrigerant. An expansion valve is always made for a specific refrigerant, and will give best operating characteristics with this refrigerant. All pressure regulating valves or pressure switches must be readjusted to the new pressure conditions imposed by the new refrigerant.

5—Ammonia should not be used in a system designed for any low pressure refrigerant. Copper tubing, brass and bronze fittings, and bronze bearings are used extensively in low pressure design. This will give trouble with ammonia. Also, ammonia operates at a higher pressure than the low pressure refrigerants, and may prove harder to hold with the lighter design. Due to high discharge temperatures, ammonia compressor cylinders are water jacketed. Some low pressure compressors have a water passage in the head, but it would be entirely inadequate for ammonia cooling. Most low pressure compressors use only air cooling on the cylinder and head.

Certain Freon 12 compressors have been used for ammonia booster compressors, that is, for the first stage of two stage compression. But the entire system is designed for ammonia, and a compressor of suitable design is chosen. In fact, some manufacturers have found it expedient to build a compressor suitable for either low pressure ammonia work or standard Freon 12 work.

6—Freon 12 or Freon 22 are the only common refrigerants with characteristics near enough to those of ammonia to be considered as possible substitutes for the latter. But it is not good policy to change an ammonia system without a complete change of all equipment. The Freons are such excellent solvents they will loosen gums, sludges and scales that ordinary cleaning processes will not touch. Therefore such a change would lead to a constant repetition of plugged valve orifices, filters, and screens. Also, the Freons are so much heavier that excessive pressure drops could be expected in the piping, ports and passages designed for the much lighter ammonia.

7—Carbon dioxide is in such a pressure class by itself that it could not be substituted in a system designed for any other refrigerant. And it would be illogical to try to use another refrigerant in the cumbersome, heavy equipment designed specifically for carbon dioxide. Where such a change is desired, all equipment is changed with a great savings in weight, space and power requirements.

Handling Refrigerants

The high vacuum refrigerants, that is, those with boiling points at or near atmospheric temperatures, or with condensing pressures near atmospheric are stored, handled and shipped in drums similar to oil drums. It should be remembered that the pressure of any refrigerant rises rapidly with a rise in temperature. Such refrigerants should not be stored near heat sources, such as a heater or boiler. Also there is always some expansion of the liquid with a temperature rise. Therefore the drum should not be filled completely full, since any rise in temperature will expand the refrigerant and cause it to bulge or even burst the drum.

TABLE V.—REFRIGERANT CYLINDER DATA

Refrigerant	% water weight to fill cylinder	I.C.C. Marks
Sulphur Dioxide..	125%	3A300; 3B300; 4A300; 4B300; 3; 4; 25; 26-150; 38
Methyl Chloride..	75%	3A150; 3B150; 4A150; 4B150; 3; 4; 25; 26-150; 38
Freon 12	118%	3; 4; 4B300; 25; 26; 38
Ammonia	54%	3; 4; 3A480; 4A480

All higher pressure refrigerants are handled in special steel cylinders that are made to conform with Interstate Commerce Commission regulations. This makes it possible to ship the refrigerant in the same container in which it is stored or sold.

In all but the smallest sizes, there is a fusible plug in the cylinder to protect it from the excessive pressure that would be present in case of fire or other excessive heat. Again it is of utmost importance that these cylinders not be overfilled. The fusible plug is to protect them against excessive vapor pres-

(Concluded on page 37)

McLaughlin Combines Manufacturing, Sales, Service

Above is an artist's sketch of the new addition planned for McLaughlins, construction of which is to be started in the spring. The addition measuring 45x28 feet is estimated to cost $6,000, and will be used for sales and display space for the frozen food cabinets and walk-in coolers which are installed by the firm.

THE manufacturer who sells and services his own product is an old story which we have grown up with, but the service man who is successful in manufacturing and selling his own product is an entirely different story.

John C. McLaughlin, Mankato, Minn., is another example of the service engineer who established himself firmly in his community as a representative of the refrigeration industry, then found that through the good will built up in the service business he had a large potential field of sales.

In 1940 the McLaughlin Appliance Company was just a little retail appliance store with some service done on the side. Came the war in 1940 and Mr. McLaughlin found it necessary to close the appliance shop because there was nothing to sell. He concentrated on service work and built up a large commercial clientele but the growing need for freezer cabinets, milk storage cabinets and other rural storage equipment drew the attention of Mr. McLaughlin, and he set out to do something about it.

Developing his own panels, he started building sectional frozen food cabinets for home and farm use and with the aid of Alex Schumann secured a new insulating block used in building walk-in coolers. During three years of manufacturing these fixtures, and in spite of the shortages of materials encountered, he has built and sold $60,000 worth of his own equipment.

The freezers are 9 cu. ft. sectional units so that they may be installed individually, in multiple or in combination with a domestic refrigerator, a milk cooler, a walk-in cooler or other such equipment. As new commercial equipment becomes available the company expects to fill out its line with companion items, thus offering the public a complete commercial line.

The service business started at the rear of McLaughlin's home. Then a 24 x 30 shop was added. Plans are now made for another extension measuring 45 x 28 feet. This new structure estimated to cost $6,000 will be attached to the residence and the rear shop will continue to be used. Eventually the

Illustrated is a 5'x8'x6' walk-in cooler with a 9 cu. ft. frozen food cabinet and a 3 can milk cooler all built, sold and installed by McLaughlins at a cost of $1,250. It is powered by a 1/2 hp. air-cooled unit for farm use or a 3/4 hp. unit for commercial use.

residence will also be turned over to the business which will provide a total space of 100 feet in length.

The new building will be used for sales and display floor and will be constructed of the special type blocks used for building walk-in coolers. Construction work is to be started in the spring.

Six men are employed by McLaughlin at the present time with the expectation of increasing to twelve men by spring.

S S S

REFRIGERANTS

(Continued from page 35)

sure, and will only fail due to heat. But the liquid in a cylinder filled nearly full would expand to fill the cylinder with a small rise in temperature. Then even a slight additional rise would exert a hydrostatic pressure in the cylinder that no steel would hold. The result would be an explosion. And you cannot explode a steel cylinder without considerable violence. No drum should ever be filled without first determining that it is empty. Then it should be weighed both before and after filling to insure that its capacity is not exceeded.

Cylinder Capacities

The men who handle different sized cylinders soon get to know the amount of the different refrigerants for which each one is safely rated. But for a new refrigerant, a new sized cylinder, or for a new person, the amount can be figured. Each refrigerant is rated according to the per cent of water weight that may be used to fill cylinders. Table V gives this data for the most common refrigerants. This means if calculation or test shows that it will hold a given weight of water when full, Table V shows the per cent of this weight that will fill the cylinder to a safe level with the refrigerant in question. Thus, if a cylinder would hold 90 pounds of water, 111.1% of 90 equals 100 pounds of Freon 12 would be its safe capacity. Table V also gives various I. C. C. specifications for the construction of refrigerant cylinders. One of these numbers is stamped on the cylinder and will serve to identify the refrigerant for which it is suitable Color codes have begun to be used, but as yet are not well standardized.

(Concluded)

S S S

ELECTRIC INSTRUMENTS

(Continued from page 31)

age drop at rated current to divert sufficient current through the ammeter element to obtain full-scale deflection. The milliammeter element would also have to consist principally of copper. As the ambient temperature increases, the amount of current flowing in the instrument element for any given line current would be lower. The inductance of the coils must also be considered. In order to overcome these difficulties, it is customary to send the full line current through the fixed coils of a dynamometer-ammeter, and to allow only the current for the moving element to be taken off the shunt, as shown in Fig. 14. This arrangement permits the use of some series resistance, and materially improves both the temperature coefficient and the time constant of the instrument. For the lower ratings, the shunt can be located within the instrument case.

(To Be Continued)

SERVICE POINTERS

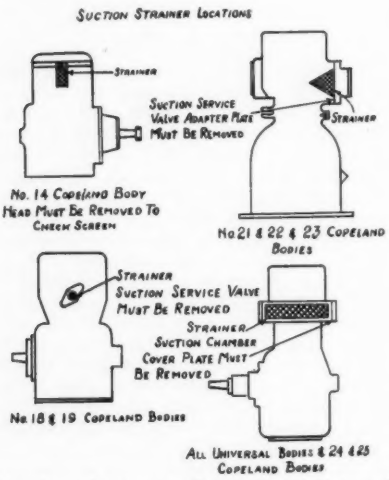
Practical Solutions of Your Service Problems

THIS department is an aid to service engineers who are seeking new devices or methods to improve their work. All the service pointers have been supplied by the subscribers. THE REFRIGERATION SERVICE ENGINEER invites readers to submit "down-to-earth" practical service and installation information. Five dollars will be paid for each pointer published. Every service engineer has one or more "kinks" that have proved useful in every day practice. Here is your opportunity to exchange service pointers with the other fellow and earn $5.00 for the information. Write up your idea today and mail it to the *Service Pointer Editor*.

SYMPTOMS OF A CLOGGED COMPRESSOR BODY SUCTION LINE SCREEN

INCLUDED here are diagrams showing the various locations of the Copeland and Universal compressor body suction screen.

It is important to understand that the clogging of the screen, in a major degree, in any of the bodies will result in faulty operation of the entire refrigeration system. For example:


SUCTION STRAINER LOCATIONS
STRAINER
SUCTION SERVICE VALVE ADAPTER PLATE MUST BE REMOVED
STRAINER
No. 14 COPELAND BODY HEAD MUST BE REMOVED TO CHECK SCREEN
No 21 & 22 & 23 COPELAND BODIES
STRAINER
SUCTION SERVICE VALVE MUST BE REMOVED
STRAINER
SUCTION CHAMBER COVER PLATE MUST BE REMOVED
No 18 & 19 COPELAND BODIES
ALL UNIVERSAL BODIES & 24 & 25 COPELAND BODIES

Location of screens in Copeland and Universal compressors

(1) Complete restriction of the suction screen will result in "no refrigeration."

(2) A major restriction will cause "short cycling" when pressure controlled, or continuous operation if thermostatically controlled. In either case, the fixture temperature will become progressively higher.

(3) A clogged or major restriction in the suction screen may falsely indicate an inefficient pump, because, during the running cycles the compressor may fail to pull down to the "cut out" setting of the L.P. control. The cause for the false indication is hard to detect since the suction screen that may be clogged is located between the suction service valve and the piston chambers of the pump.

To test for a clogged screen in a Copeland pump, attach your compound gauge to the suction service valve in the same manner for testing suction line pressure. Install a *second* compound gauge on the crankcase ports and run the condensing unit. If there is any pressure difference between the reading of the two gauges, the screen should be checked and cleaned, if necessary.

In the event you do not have two gauges, it will be necessary to remove the suction service valve from any pump larger than the No. 14 Copeland, or the head of the No. 14 body to check the screen. The screen if clogged may be cleaned with any good solvent, such as gasoline, naphtha, carbon tetrachloride or zylene.—*Submitted by Hussmann Refrigeration, Inc.*, St. Louis, Mo.

* * *

CHANGING REFRIGERANTS

IN CHANGING over old SO_2 compressors to Freon or methyl which sometimes is discouraged by the manufacturer and most of the time ends up in a serious amount of belt trouble and compressor vibration and in snapping compressor shafts, we found our idea worked perfectly. On several Frigidaire model "K's" and "O's" that we had rebuilt for Freon, we raised the cylinder assembly with four cylinder gaskets and thereby created a space at the top of the piston on its extended upward stroke cutting down the compression stroke.

Using the same size pulley and motor as on the SO_2 machine and same compressor speed we still maintain approximately the same compressor capacity.

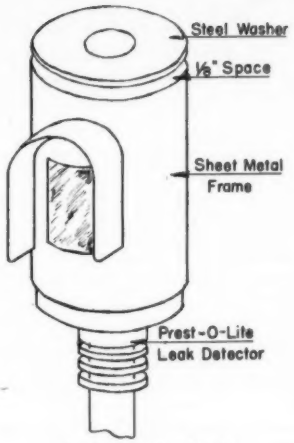
The principle of the space and spacer rings above the piston is used on some Carrier Air Conditioning units.—*Submitted by Elmer Frierdich, Caseyville, Ill.*

CLEANING SEAL SHAFT

A FASTER and easier way to clean the crank shaft extension before installing a new shaft seal is to cut off a two inch length of old rubber garden hose, split it down the entire length on one side then line this with fine sand paper or emery cloth with the abrasive on the inside. Sand paper or emery should be cut long enough so slit in hose holds ends. Before I start to clean a shaft I plug the lower oil drain hole with a ball of friction tape. *Submitted by C. A. Bricknell.*

SHIELDING THE LEAK DETECTOR

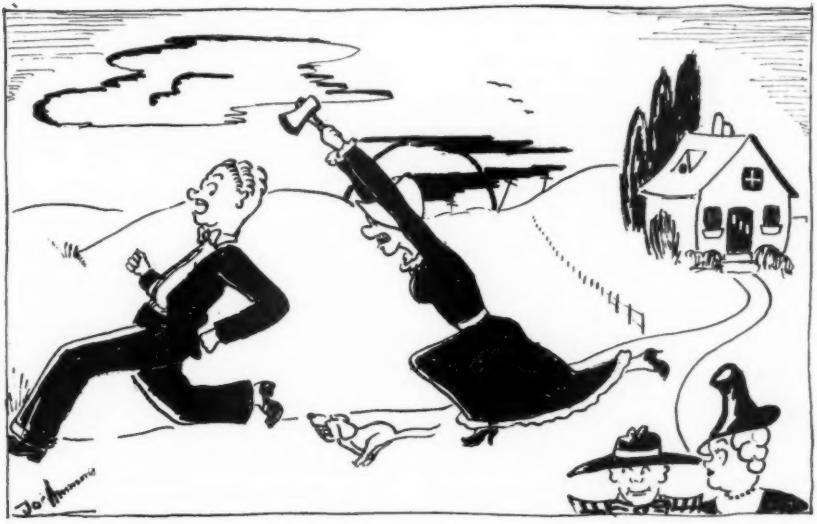
I HAVE been using a leak detector light shield for seven years and find that it helps considerably in finding small gas leaks, especially in well-lighted rooms where at times with the ordinary leak detector the flame is hardly visible.



Leak Detector Shield

This shield which is my own version looks like this and slides over regular Presto Leak detector.—*Submitted by Elmer Frierdich, Caseyville, Ill.*

That's the refrigeration fellow who left the butter out of Mrs. McNulty's refrigerator after he had worked on it.



QUESTIONS AND ANSWERS

On Problems of Servicing, Installation and Maintenance of Household and Commercial Refrigerating Equipment—Send Your Problems to the Question Box.

MILK COOLING

QUESTION 728: I was called on a job and I told the man that it would not work the way he expected it to. I am wondering if the job would work running 18 hours. I notice that the line from the condenser to receiver is ¼" (should this be larger?)

In this milk room there is a cement tank 4" thick, 6" thick on bottom, 12" above floor, 2" boards for lid. The tank has an overflow so there can only be 20" water in tank.

The compressor sets 7 feet above the tank in a hallway. The temperature there was 110° and 90° in milk room. With SO_2 in this job, will oil remain in the coil? The water in the tank never gets above 70° and it won't pull below 60°.

Here is how the job was sold to the man. He milks 25 to 30 cows (milking machine) in 1 hour 15 minutes. When he starts milking he turns on compressor and when he is finished milking, the water bath is to be down to 34° to 36°, then he stops compressor (no control on job). As soon as he gets a can of milk-98° (10 gal.) he puts it in the tank. This 10 gal. can displaces that amount of water through the overflow and by the time he has finished milking he has six 10 gal. cans of milk in tank which, of course, displaces that much water.

As the cans are removed the tank is filled to the overflow with water and this is repeated twice each day. I think I figured the water load pretty close, but am not sure just how to figure the 98° milk.

I have most all the copies of the magazine for the past ten years, but cannot find anything quite like this, so could you give me a lift?

Will you also tell me how many Btu's one foot of ½" tubing will take care of?

ANSWER: A number of important factors in milk cooling must be taken into consideration when specifying the equipment.

If an uninsulated tank of the dimensions you state is maintained at 35 degrees, it will require 10,800 Btu. per hour removal. Cooling the water that must be replaced will require the removal of 3,200 Btu. per hour for 6 hours. Cooling the milk in three hours will require the removal of 10,200 Btu. per hour of which about 6,000 Btu. can be utilized from the water or 2,000 Btu. per hour. The milk cooling will then amount to 10200-2000 + 8200 Btu. per hour. This will give a total load of 10800 + 3200 + 8200 = 22200 Btu.

Obviously, the ½ hp. unit is much too small for the job. If a suitable water supply is available, it would be good engineering to use the water-cooled machine. Under no circumstances should the unit be placed where the temperature is 100 degrees or warmer.

It will require about 200 feet of ⅝ tubing to supply adequate evaporator for the 2 hp. water-cooled unit.

The refrigeration load cannot be figured over an 18 hour period because milking is done on the average of every 12 hours.

I would suggest using Freon-12 as the refrigerant and possibly splitting the evaporator into two units; feeding them with separate one ton valves and using a ¾ inch suction to the machine.

The machine will have to be made automatic because it cannot possibly cool this large volume of water and milk in the short time required to milk. This means that the unit must run considerable in between milkings.

References on milk cooling will be found in the following issues of The REFRIGERATION SERVICE ENGINEER: August, 1939; July, 1938; June, 1934; September, 1937; and August, 1938.

CLEANING LOW SIDE FLOAT

QUESTION 729: I have a call on a Bishop and Babcock Ice Cream Cabinet and Fountain using two Frigidaire low side floats and find the floats in bad condition from sludge, etc. (no moisture). It is a Frigid unit, ("K" comp.) with low pressure control and automatic regulator valve in the suction line.

I can clean out the unit (comp. receiver and condenser) with carbon tet and Freon, but don't know what is the best way for cleaning evaporators as one is in a brine tank. I mean without removing it from the cabinet.

Have you any suggestions.

ANSWER: The problem you have of cleaning a low side float evaporator without removing from the cabinet is not feasible.

In order to do a thorough job of cleaning, the evaporator will have to be removed, cleaned and dehydrated. You might eliminate most of the foreign matter by pouring carbon tetrachloride into the evaporator tubes, then run a soft wire through each tube. Attach a piece of chamois skin to the wire and pull it through.

Blowing out the tubes can be accomplished by using the suggestion offered by Elmer L. Fair in the Service Pointer section of the September issue of The REFRIGERATION SERVICE ENGINEER.

WHAT SIZE CAPILLARY

QUESTION 730: Please give me data on required amount of capillary tube if same unit and evaporator were used, using sulphur in one and assuming it to take 8 ft. 2 in. now what would it have been for Methyl and Freon? Some contend a different bore of capillary should be used, if so what would be the result if a Crosley sulphur capillary was used on Freon or Methyl, and it was cut off to proper length for correct operation.

I have a job using 6-6 inch of capillary Crosley size and low side is 3 or 4 lbs., and it seems to equalize too fast when it shuts off. Should I add more to prevent equalizing so soon? If so, and low side would go to zero lbs., then what would I do? Should gas be added to bring it back to 3 or 4 lbs.?

ANSWER: There is a great deal of information available on the designing of capillary tubes for the various size units for the several refrigerants that are now used. The following information has been taken from the American Society of Refrigerating Engineers Data Book relative to the diameter and length of capillary tubes for given suction temperatures and Btu. ratings of the condensing units.

H.P.	B.T.U.	SUCTION	BORE	LENGTH
1/6	800	18°	.032	6
1/8	975	18°	.040	17
1/6	1550	26°	.040	6
1/5	1550	26°	.050	9½
1/4	2125	26°	.050	6½
1/4	2125	26°	.040	3
1/3	2800	26°	.050	5
1/6	800	0°	.040	15
1/4	1260	0°	.040	12
1/3	1620	0°	.040	10
1/3	1620	0°	.050	12

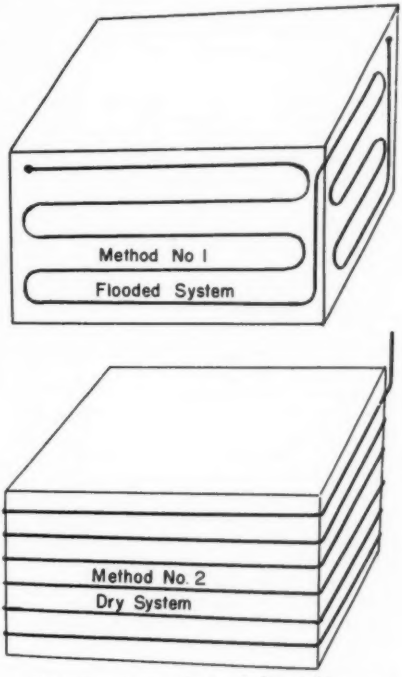
The table presented here is not intended to cover all machines but will give you some idea on the information you need at the present time. The table is based on using Freon-12.

You have not stated in your letter the size of unit being used with a 6½ capillary tube. Either changing the length or replacing tube with a smaller diameter bore will give you the desired results. You must remember that all capillary systems are balanced systems, therefore, the proper charging is a matter of completely filling the evaporator regardless of the pressures encountered.

BONDING TUBING TO LINERS

QUESTION 731: If you will kindly enlighten me on the proper procedure of bonding copper refrigeration tubing to galvanized liners, I shall greatly appreciate same.

We are experiencing considerable difficulty on account of the great difference in the expansion of copper and galvanized iron



Illustrating two methods winding tubing on liners

when heated and the liner and tubing have a tendency to leave one another.

Also I would appreciate any information from an efficiency standpoint you could give me concerning continuous tube evaporator where the liquid line enters the top against our old method in diagram. We have been using method No. 1, but find an oil sump created where tubing is vertical on each corner of liner. We inquire if method No. 2 would not work much better where the velocity would tend to return most of the oil. In most cases 3/8" and 1/2" tubing is used and compressor from 1/4 to 1/2 hp. Inside liners run from 12 CF to 24 CF.

ANSWER: Companies who make evaporators from galvanized iron and copper tubing do not reveal just how they accomplish the desired results. It is presumed that the galvanized iron is held in a jig to prevent buckling when it is heated. Some companies put the finished evaporator through a straightening process after soldering.

Soft solder does not maintain the bond as well as hard solder does but the heat required for hard solder or brazing destroys the galvanized surface; therefore, soft solder must be used unless the galvanizing is done after fabrication.

The logical method of feeding an evaporator such as you describe is to attach the expansion valve to the bottom. If you experience difficulty in oil logging on the down feed hook-up, it is quite possible that the velocity of the vapor through the tube is too low. A fully loaded 1/2 hp. unit should offer sufficient velocity to carry the oil up in a 1/2" tube but a 1/4 hp. unit will not evaporate the refrigerant fast enough to maintain the velocity.

MEAT DISCOLORS IN COOLER

QUESTION 732: I have been called in to service a walk-in box the interior dimensions being 8' high 9 1/2' deep and 6 3/4' wide. The trouble is that meat has a tendency to turn black after hanging about a week. The box is powered with a 1 hp. Par and is cooled with two American Coil Co. blower coils Model 9A30 facing each other diagonally one at each end of the room about 9 1/2' apart. My contention is that these two coils are too small for this box as they frost up completely in a short time causing the air to dry and in turn the meat also drys. The owner would like to supplement these two coils with a third coil rather than replace with larger coils as it appears to be the only cheap way out of a bad situation. What size blower coil would you suggest and how would you relocate the three coils.

Where can I get data and information as well as the necessary equipment to put alarm systems on walk-in boxes maintaining a temperature of 36 to 40 and freeze boxes having a holding temperature of from zero to five above.

Any information you may be able to give me on the above problems would sure be appreciated.

ANSWER: I believe your problem of the proper evaporators for the walk-in cooler goes deeper than the adding of another cooling unit.

If you will read the article "Selecting Evaporator and Condensing Unit" by D. D. Orr that was published in the March issue of THE REFRIGERATION SERVICE ENGINEER, you will better understand your problem.

You have not given sufficient information on the construction or product load for us to make any estimates. It would seem that the compressor is too large or that the coils are too small. If the compressor is operating less than 14 hours per day, it is very likely that an additional coil would be absolutely of no value.

There is no cheap way out of an improperly balanced system unless the unit is too large. In this case the compressor can be reduced in speed to balance the load.

I believe any of the control manufacturers can supply you with a control for the temperature range required on an alarm system. Such a control could be hooked up to a light or bell system for alarm purposes.

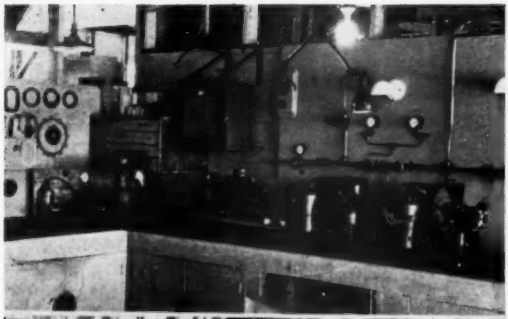
PRESSURE INCREASES WHEN THAWZONE IS ADDED

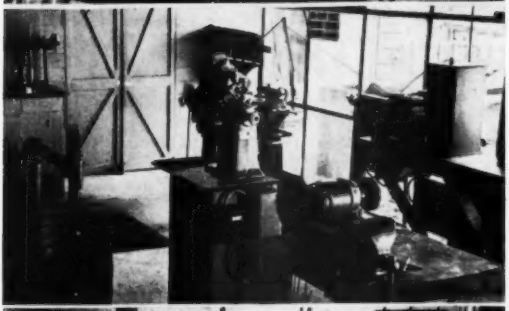
QUESTION 733: Will you please advise me if a 10x20 condenser with 30 3/8 inch tubes is the proper size condenser for a 2x1 1/2 two cylinder 400 rpm charged with methyl chloride.

I was looking in one of the catalogs for a thermostatic expansion valve. In one of the advertisements it states adjustment from 0 to 30 super heat. Will you please explain just what this means.

I was having trouble with a 1/3 hp. unit with moisture. After pouring one ounce of Thawzone in the crankcase the pressure went up to 140 lbs., a rise of 50 lbs. This unit is charged with 4 lbs. of methyl chloride, room temperature 70 degrees. Will you please explain what caused the pressure rise.

(Continued on page 46)





AIR CONDITIONING FOR TRINIDAD ARMY POST

AN INTERESTING letter and the pictures of his shop reproduced here were recently received from L. E. Edwards, a member of R.S.E.S. now serving in the Army as superintendent of air conditioning and stationed at Fort Read, Trinidad, B.W.I. The letter describes in detail two of the installations made by him and provides some hint of the difficulties to be overcome due to a lack of materials. The letter in part states:

"Enclosed you will find four snapshots of my shop here at Ft. Read in Trinidad. Thought it might be interesting to someone who can see what we have accomplished at one of the Army outposts. Besides the Ft. Read post, I have air conditioning at three large airfields under my supervision.

"Just finished a 12 ton air conditioning plant in the Army Airway Communication Transmitter Building here. Have a 34 k.w. connected heat load from all transmitters operating at least 14 hours out of the 24. Had to use all salvage material including a salvaged R 10000 Brunner compressor, 10 hp. G.E. motor, a CV49F York evaporating unit using a 4 row coil with an Alco 6 ton valve and 6 row coil with an Alco 6 ton valve. It was necessary to make all fittings out of copper tubing as there were no ells, tees or reducers available. I have the unit gauged at the compressor, suction and liquid at the coils and also the coil side of each expansion valve. Equipped the Brunner unit with an auxiliary water-cooled York receiver to give added receiver capacity for additional coil.

"This building is an ordinary wooden building insulated with two layers of one inch Celotex on walls and ceiling and one inch pine flooring. It holds a 72° temperature with a devia-

tion of three degrees (70° to 73°). Humidity is 57% with a range of 5%. Unit cycling operates 11 hours out of the 24 hours. Operating pressures are as follows: 130 lb. head, 28 lb. back pressure at the condensing unit, 120 lb. liquid and 35 lb. suction at the coil, 75 lb. pressure drop across both valves, 88° liquid and 45° suction with 55° air off coil to room. The homemade atmospheric cooling tower uses heated water from one of our Diesel power plants. Have installed a recording hygrometer and pressure gauges to give me a written record of the performances of this plant.

"I intend to start overhauling a 15 ton Carrier central unit in our telephone building. This unit has been operating constantly for over four years without one overhauling. I will have to rebuild the 7F6 Carrier compressor, repair the condensing coil in a 956 evaporative condenser and rebalance the fan in the 43B diffuser. All my help here are colored native service men, and they are good ones too.

"We have a unit of the Carnegie Institute here who operate the Ionosphere Transmitter Building, which measures the radio waves and reception for the Western Hemisphere. Had to fabricate an air conditioning plant for them out of salvage also; using a Chrysler Airtemp diffuser with a three ton valve, and a Carrier 7K3 compressor mounted on a 7K4 mount taken from a 41B Carrier unit salvaged from a fire. I also used an air condenser from a Canadian Gibson condensing unit with the receiver, and cool the condenser with an exhaust fan taken from a salvaged cooling tower. Have two rooms insulated with Celotex, full of transmitting and receiving apparatus. They maintain an even 70° with 53% humidity 24 hours with the unit cycling 9 hours out of the day. I had to make all my own heat exchangers, dehydrators and fittings for both these jobs."—*L. E. Edwards.*

FOOD REFRIGERATION FIELD ONE OF THE SEVEN BEST OPPORTUNITIES

IN AN article discussing seven opportunities to make money, appearing in the January issue of *Nation's Business,* the refrigeration of foods was given a prominent place.

The food refrigeration business, according to the article, is wide open. It is a field in which a man can make his way in the traditional risk-taking manner.

The frozen food industry includes these factors:

Processors

1. The processor who freezes fruits, vegetables, sea food, meats and poultry. In this field are such giants as General Foods, Standard Brands, Libby, McNeill & Libby, and some 500 others. About $10,000 is needed for a start in this field which is making plans based on a projected 10,000,000,000 pound industry within five years. (It was about 800,000,000 pounds last year or about six times what it was in 1937.) Into this field are now hastening canners, packers of California fruits, ice cream companies, produce companies, ccoperatives. Even department stores. L. Bamberger Co. of Newark, N. J., is bringing out a line of frozen cooked foods to be distributed through their own store and through Macy's of New York.

Locker Plants

2. The locker plant operator who does a business which is a combination retail store, frozen food distribution agency and miniature processing plant. About $5,000 is needed to enter this branch of the business. The trend in new locker plant operation, according to experts in the field, is away from the rental of lockers to consumers and toward sale of commercially frozen foods, supplemented by house-to-house delivery.

Food Distributors

3. The distributor of frozen foods who sells wholesale. Jobbing grocers, dairies and produce firms are going into the business of being middle man between the commercial freezing plant and the retail outlet, or of selling with refrigerated trucks directly to consumers. Distributors expect business to triple in three years.

Equipment Manufacturers

4. The supplier who provides the equipment, the freezing and packaging machinery, used by the industry. Such companies as Westinghouse, General Electric and International Harvester are manufacturing freezing units for farm and city use. Some day, predict freezers, a cook will come into a home perhaps once a month, prepare complete meals which will be stored in the home unit to be drawn upon for weeks to come. Makers of freezers expect to sell 10,000,000

units over the next five years, a golden opportunity for distributors and small metal fabricators.

5. The individual who has an idea for a cooked food product. All he needs is a kitchen oven, a good recipe and a freezer.

On the job side, there will be many more refrigerator mechanics. Frozen food companies will also need salesmen, advertising executives, package designers.

Since frozen food companies are just starting out or still growing swiftly, men who hitch their careers to them have a good chance of getting in on the ground floor, working in a flexible outfit with room at the top—and in an expanding field.

REFRIGERATION CONTRACTORS COMPLETE ORGANIZATION

FORMAL organization of the National Association of Refrigeration Contractors was completed at a meeting January 21 and 22 in the Carter Hotel, Cleveland. Attending the two-day meeting were refrigeration contractors from 38 states, representing more than 1,000 firms and individuals in this important segment of the refrigeration industry.

Constitution and by-laws of the new association, formulated by a committee appointed at the meeting held last December 10 in the Palmer House, Chicago, and unanimously approved by delegates to the Cleveland meeting, place the management of the organization in the hands of a board of twelve directors, six representing geographical areas of the country and six chosen directors-at-large.

Regional directors elected at the meeting are: L. C. Anderson, River Forest, Illinois; W. E. Booth, Richmond, Virginia; Nathan Edelstein, New York City; C. R. Faulkner, Longview, Texas; M. M. Jamison, Dayton, Ohio; and J. F. Park, Los Angeles, California.

Directors-at-large are: W. L. Drake, Indianapolis; William G. Euth, Detroit; Warren W. Farr. Cleveland; A. M. Palen, Minneapolis; Lee Shirar, San Francisco; and Eldon S. Wright, Youngstown, Ohio.

National officers, chosen by the directors, include: Warren W. Farr, president; M. M. Jamison, first vice-president; J. F. Park, second vice-president; A. M. Palen, treasurer; E. S. Wright, recording secretary; and L. C. Anderson, sergeant-at-arms.

Both officers and directors will serve until the next meeting of N.A.R.C., which will be held in October of this year during the All-Industry Refrigeration and Air Conditioning Exhibition in Cleveland.

A Life Membership in the association was voted to W. Ray Kromer of Cleveland, whose efforts were largely instrumental in getting plans for the association under way, and who served as chairman of the group during the organizational period. Mr. Kromer explained that because his future association with the refrigeration industry would be national in scope, and involved his leaving the contracting phase of the business, it

Officers and directors of the National Association of Refrigeration Contractors: Left to right, seated — L. C. Anderson, River Forest, Illinois; W. Ray Kromer, Cleveland; Warren W. Farr, Cleveland, president; M. M. Jamison, Dayton, Ohio, vice-president; E. S. Wirght, Youngstown, Ohio, recording secretary; A. M. Palen, Minneapolis, treasurer. Standing, left to right—W. E. Booth, Richmond, Virginia; W. L. Drake, Indianapolis; Nathan Edelstein, New York City; C. R. Faulkner, Longview, Texas; Lee Shirar, Los Angeles; William G. Euth, Detroit.

would not be possible for him to continue his association in an active capacity, but that he would continue to be interested in N.A.R.C. activities and would work closely with officers and directors in every way possible.

Three classes of membership were provided for, as follows:

Class A—Individual firms employing one or more refrigeration mechanics, and located in an area in which there is no local refrigeration contractors association affiliated with the N.A.R.C.

Class AA—Individual firms, located within the jurisdiction of an affiliated local contractors association, who wish to join N.A.R.C. on a member-at-large basis. However, to qualify for member-at-large classification, these firms must also be members of their local associations.

Class B—This classification covers local contractor associations having ten or more members qualifying for membership under N.A.R.C. standards, and allows these groups to be represented in the national organization in relation to their local membership strength.

The right to vote in national association affairs was set on the basis of one vote for each five members of a local association enrolled as a Class B member, and one vote for each individual firm holding Class A or Class AA membership.

Will Incorporate

It was decided to incorporate the association and develop a special emblem for use by member firms and organizations. Letters and telegrams received and read during the meeting indicated an interest on the part of refrigeration firms far beyond the actual number in attendance at the affair. Responses to inquiries sent by mail to several thousand contractor firms in all parts of the country are still being received, it was reported at the meeting, indicating that the new association fills a long-felt industry need.

With the permanent organization framework settled, an intensive campaign for new members is being launched, and if the present nation-wide interest is sustained, membership will be in excess of 1,000 contractors by the time of the next N.A.R.C. meeting in Cleveland next October. Selection of additional regional directors, and of an executive vice-president or secretary-manager, is now under consideration, and will be announced shortly.

In discussions during the two-day meeting, particular emphasis was placed on the type of contractors most desirable for membership in the association, and in the development of standards of business etihcs and workmanship to keep the level of this phase of the industry at the highest plane. Cooperation with other associations in the industry also was pledged.

Many Applications In

Particularly encouraging to those contractors whose efforts brought about formation of the new association were the large number of applications for Class AA memberships—those memberships covering individual firms already represented by local groups affiliated with N.A.R.C. In the opinion of the directors, this indicates an active interest in the group's activities by these individual firms, and will strengthen in a large measure the work of the national organization.

Committees are already functioning to meet the immediate problems of the refrigeration contractor. One of the important committees has as its task the investigation of war surplus materials and their possible effect on the business operations of N.A.R.C. members.

PRESSURE INCREASES—

(Continued from page 42)

ANSWER: In checking specifications on several condensers, we find that the condenser you describe is adequate for a ½ hp. unit under severe conditions. The same condenser is adequate for a ¾ hp. compressor under normal conditions.

When superheat is referred to in expansion valve adjustment, it means that the adjustment of the valve can be made so that the bulb temperature controlling the opening and closing of the valve can be regulated so that it closes when the temperature is 0° to 30° above the actual evaporating liquid temperature.

It is difficult to determine why the head pressure would increase so much on adding Thawzone. If the water is broken down into its components, there will be hydrogen and oxygen present. The oxygen would have to be released gradually and would then oxidize the oil rather than ignite it.

It might be well to investigate the possibilities of aluminum being present. This would also cause the increase in head pressure.

REFRIGERATION IN GERMANY

AT THE end of hostilities representatives of the U. S. Army investigated various matters of industrial development in Germany. Reports of some of these have been released by the U. S. Department of Commerce. In connection with refrigeration the reports, as would be expected, show that developments in Germany were not in line with those in the United States, although ingenuity was frequently employed to offset lack of equipment and material.

Refrigerated Train

More than 10 years ago Kuhltransit, A.G., Hamburg had placed a refrigerated train on the Dresden-Hamburg run with 10 cars cooled by a refrigeration unit in a machinery car. This train was found in Dresden after the war. The operators reported it had not been economically successful and had not been used during the war. American engineers will remember that some people advocated a so-called "head-end" car to carry equipment for air conditioning of an entire passenger train. The matter was never developed in this country either for air conditioning or refrigeration.

Ice by Pipe

In the plant of I. G. Farbenindustrie near Dortmund equipment was installed for producing 321 long tons of ice per 24 hours. It was a block ice plant with conventional production methods. After manufacture the ice was crushed and carried through 8 in. pipes to various dye processing rooms throughout the extensive plant. The report on this plant reveals that two circulating pumps each with motor input of 80 kw. were installed to distribute the ice through these pipes. Whether both pumps were used simultaneously, or one was a standby is not stated.

Low Temperature Refrigeration

To obtain temperatures down to —96° F. some refrigerating systems installed by the Germans used three stage ammonia compression. Where lower temperatures were required a cascade system using ethylene in addition to ammonia was employed.

No new refrigerant was employed by the Germans during the war. They used ammonia for virtually everything except installations aboard submarines. Only a small supply of Freon 12 was available. In the submarines of later design air conditioning was done by the reversed refrigeration cycle and provision was also made for making of fresh water by collecting the condensate from the cooling coils.

Air Conditioning of Tanks

Some novel ideas about producing comfort for men operating armored tanks were developed by research in a chamber set up to provide air conditions similar to those in North Africa. The Germans decided it was necessary to condition the tank for the radio operator and driver only. The research work further showed that the best means to accomplish this result was to cool the heads only of these men. This was to have been accomplished by means of a transparent plastic hood which would extend down over the head and to the shoulders of the subject, and through which conditioned air would be delivered.

Their research had been done in conjunction with the Medical Society of Germany, and temperatures of these men had been taken at as many as 45 different body points before it was finally determined that the critical point was the veins located in the temple.

It was determined that if the heads of the men were cooled they could stand body temperatures which would result in tanks under desert conditions. The Germans did not find this out until after the campaign in North Africa was over and hence the idea was never used.

S S S

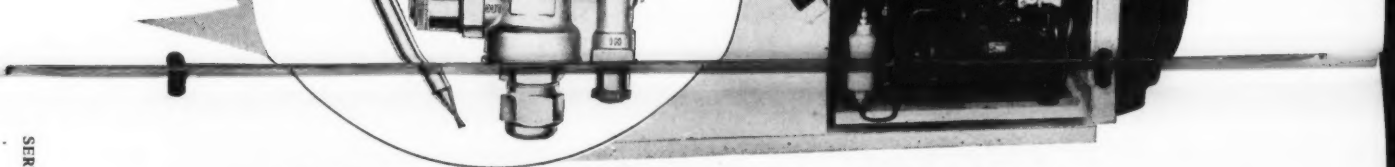
SOME FACTS ON FROZEN FOOD INDUSTRY

AROUND six times as much frozen food was consumed in 1945 as in 1936—700,000,000 to 800,000,000 pounds as against 125,000,000, exclusive of poultry, fish and meat.

From only a handful before the war, the number of frozen food packers now has reached more than 800, and may reach 2,000 within the next few years. About twenty of these packers already are freezing precooked foods.

More than 30 per cent of all department stores already carry frozen foods in their grocery departments, and nearly 20 per cent more stores plan to carry them, according to a recent survey. The total number of retail stores now selling frozen foods is between 35,000 and 40,000.

SATISFACTION
FOR CUSTOMERS
AND SERVICEMEN—WITH
VALVES...
Herbert Frame
Service Manager
Public Service Co.
Baltimore, Maryland



Herbert Frame, Service Manager of the Public Service Co., of Baltimore, shown above, is checking the temperature of an ice-cream cabinet on test. A standard "A-P" Thermostatic Expansion Valve Model 207 is used on this job as standard equipment.

Writes Mr. Frame: "A-P Valves for high and low temperature work have been used by our company since 1936. Customers' satisfaction as well as servicemen's satisfaction has been accomplished by the use of A.P. Valves during this period."

There is more profit for servicemen and customers alike — with standard A-P Thermostatic Expansion Valves that can be used on low temperature, commercial temperature, and air conditioning work without adjustment.

You have less stock to carry, and your customers get better service—the kind that keeps them your customers year in and year out.

Bulletins covering all "A-P" Refrigeration Controls will be sent you upon request.

AUTOMATIC PRODUCTS COMPANY
2454 N. 32nd Street, Milwaukee 10, Wis.
Export Dept. 13 E. 40th St., New York 16, N. Y.

DEPENDABLE *Refrigerant Valves*

Stocked and Sold by Good Refrigeration Jobbers Everywhere • Recommended and Installed by Leading Refrigeration Service Engineers

AIR CONDITIONING AT $1.27 PER MONTH PER ROOM

AIR conditioning can be included in post-war apartment building developments at a cost to the tenant of approximately $1.27 a month per room, it was reported to the Refrigeration Equipment Manufacturers Association today.

The estimate is based on a study made by engineers and architects of modern air conditioning equipment and the methods by which such equipment can best be utilized in new apartment buildings.

Detailed results of the study, according to the report, indicate that a modern apartment in a temperate climate can be air conditioned during the warm season at a total cost of about $15.30 a room, or $1.27 a month over a year.

The cost includes a complete return on the initial investment in air conditioning equipment in 20 years, taxes, administration, electrical energy, condenser water, operating labor, repairs and 6 per cent interest on the unreturned investment.

The above figures, REMA officials said, indicate that air conditioning is not a luxury.

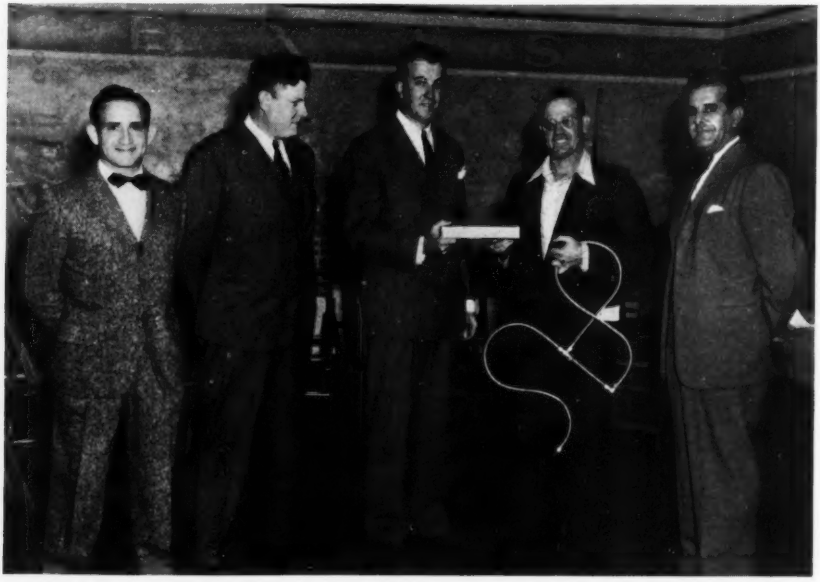
They pointed out that air cooling has already become a "must" for theaters, shops, hotels, restaurants and office buildings as evidence that the public is coming to regard this form of comfort as a necessity. Apartment buildings without air conditioning will become obsolete in 10 years, it is predicted.

C. H. CHAPMAN WINS HOUSTON TUBE BENDING CONTEST

C. H. CHAPMAN set some new records in winning the Imperial Tube Bending and Flaring Contest sponsored by Standard Brass & Mfg. Co. in Houston, Texas, on December 19. He completed the contest problem in 14 minutes, 11 seconds and turned in a perfect specimen.

Fred L. White was second, completing the project in 15 minutes. Third prize went to R. S. Mann, with an elapsed time of 20 minutes.

The contest drew a large attendance and developed spirited competition.



C. H. Chapman, winner of Imperial Tube Bending and Flaring Contest, sponsored by Standard Brass & Mfg. Co. in Houston, receives first prize from Harry Pearson of Imperial Brass. Shown above from left to right are: Joe Cartullo, Standard Brass & Mfg. Co.; George Franck, Imperial Brass; Harry Pearson, Imperial Brass; C. H. Chapman, winner of the contest; and George Boone, Standard Brass & Mfg. Company

Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

COMING CONVENTIONS

RSES Convention
Place: Hollenden Hotel.
City: Cleveland, Ohio.
Date: October 26, 27, 28, 29, 1946.
Secretary: H. T. McDermott, 433 N. Waller Ave., Chicago 44, Ill.

REMA Meetings and Convention
Spring meeting: March 4-5-6-7, 1946.
Place: Stevens Hotel, Chicago, Ill.
Joint meeting with jobbers.

All Industry Exhibition:
Place: Cleveland Public Auditorium.
City: Cleveland, Ohio.
Date: October 28-29-30-31, 1946.
Exec. Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pa.

REWA Meeting
Date: March 4-5-6, 1946.
City: Chicago, Ill.
Exec. Secretary: H. S. McCloud, 920 E. McMillan St., Cincinnati 6, Ohio.

Wisconsin State Assn.
Place: The Park Hotel.
City: Madison, Wis.
Date: March 16 and 17.
Secretary: A. L. Robertson, 409 Walton Place, Madison, Wis.

Interprovincial Assn.
Place: King Edward Hotel.
City: Toronto, Ontario, Canada.
Date: March 17 and 18.
Secretary: E. G. McCracken, c/o Laird and Vanderhoof, Leaside, Ontario, Canada.

* * *

Edgar A. Poole
New Brighton, Pa.

No other publication or society can compare even favorably with R.S.E. or the R.S.E.S. My files are complete to date having the June 1933 issue. It sure has come in handy many times.

MAKE YOUR CHAPTER NEWSWORTHY IF YOU WANT PUBLICITY

It was in a meeting of the Corn Belt Chapter that one of the members complained of not being able to get the local newspaper to run news items about R.S.E.S. Mr. M. V. Stagg, assistant to the Manager of Williams Oil-O-Matic who was in attendance replied to the complaint. We think many chapters can benefit from the suggestions offered in the following reply which explains why your news items very often do not reach print.— Editor.

EVERY day sees 144 morning and 1,241 evening English language newspapers roll off presses throughout the United States. In addition, there are 177 newspapers whose various editions are printed throughout the entire day. Every 24 hours, 47,025,254 Americans buy copies of these newspapers. Sunday editions (444 of them) have a circulation of 38,130,864.

When you realize that each of these newspapers reaches an average of probably 3 or 4 readers, you begin to see why the local newspaper is the target of every organized group or society. They all want to "get their names in the paper." This desire for free publicity is shared by every alert member of the Refrigeration Service Engineers' Society. All of us fully realize that every time an item about the Society appears in print, it has a real dollars and cents value.

Much as we like to see our Society's name in the papers, there is another side to this publicity question. That is the editor's side.

Earlier I said that every 24 hours 47,025,254 Americans *buy* copies of the Nation's daily papers. And I mean *buy*. Because newspaper circulation, probably more than

anything else in the business world, is based on voluntary purchase. Since people *buy* newspapers, the editor bears a tremendous responsibility. He knows that people buy his paper to read the latest *legitimate* news. That is the yardstick by which the editor measures his paper. And we respect him for it. You and I wouldn't give even a cent for a paper whose columns were padded with the hand-outs of publicity-hungry groups.

Our first job is to make the Refrigeration Service Engineers' Society mean something in every community where it is active. We know that the R.S.E.S. is an organization to improve and better the quality of refrigeration service work through education and the acceptance of certain standards and qualifications for members. Sure! We know this. But—does the public, the public that *buys* the newspapers?

This missionary work is 100% our responsibility. How can we acquaint the public with the Society and its good work? By consistent use of store cards, truck cards, business cards, letterheads, telephone directory listing, and co-operative newspaper ads. While they seem insignificant in themselves, promotional helps like those mentioned aid in achieving public acceptance.

Such a program of activity gives the appearance of a going concern. Gradually, the man who gets R.S.E.S. service begins to feel that he is getting the *best* service. Little by little, the R.S.E.S. emblem begins to assume a certain significance. Eventually that becomes *news* significance. Then the doings of the local, state and national R.S.E.S. and its members become newsworthy. Then you will find a cordial welcome in the offices of your local paper. But it's your move *first*.

WISCONSIN STATE ASSOCIATION MEETING MARCH 16-17

PLANS are nearing completion for the Wisconsin State Association meeting to be held in Madison, Wisconsin, at the Park Hotel March 16-17. An interesting program is being arranged which will include a banquet, dancing and entertainment in addition to the business and educational sessions. Arrangements are being made for the entertainment of the ladies and they are invited to attend.

Opening on Saturday morning, March 16th, the first morning of the Convention will be devoted to registration. At 2 P.M. the meeting will be called to order with an address of welcome followed by a half-hour business session. Two speakers are planned for the afternoon session winding it up with a question box period at approximately 4 P.M.

On Saturday evening at 8 P.M. a dance and entertainment will be held. At 10:30 A.M. Sunday, March 17th, the meeting will again be called to order with reports by various committees. The installation of new officers will take place at noon Sunday and the balance of the meeting will be spent in an educational program. At 1:30 P.M. the Annual Banquet will be held.

7TH ANNUAL INTERPROVINCIAL ASSOCIATION CONVENTION MARCH 17 AND 18

PLANS for the 7th annual convention, sponsored by the Interprovincial Association of Canada, are nearing completion. This two-day conference will be held at the King Edward Hotel, Toronto, on Sunday and Monday, March 17 and 18.

This annual meeting is assuming great importance each year in the Canadian refrigeration industries and a larger attendance than ever is expected because of the lifting of various wartime restrictions which have hampered the meeting to some extent in the past few years.

Make Hotel Reservations through Secretary

Hotel space is quite limited and for that reason it is asked that all reservations be made through the Secretary of the Interprovincial Association—Mr. E. G. McCracken of Laird and Vanderhoof, Leaside, Ontario. Reservations must be made as early as possible in order to assure proper accommodations.

Convention will open at 10 A.M. Sunday the 17th and close on the 18th with a banquet under the auspices of the Ontario Maple Leaf Chapter. The educational program is not yet complete but will include talks on Accumulators and Evaporative Condensers; Farm Freezers and Locker Storage Service; Air Conditioning Operation; Heat Interchangers; Zero and Subzero Temperature, Industrial Application; Insurance, Shop Maintenance and Administration. A profitable two-day visit is assured all those who plan on attending.

Honeywell provides the answer with the Polartron *System* of Automatic Defrosting Control. — Applicable to all "above freezing" fixtures the Polartron System provides for temperature "Cut-out" and Pressure "Cut-in" operation thus assuring positive defrosting at the end of each "on" cycle. Take advantage of the full capacity built into your refrigeration equipment — use the Polartron System. See your jobber for further details. Minneapolis-Honeywell Regulator Company, 2934 Fourth Avenue South, Minneapolis 8, Minnesota. Branches and distributing offices in all principal cities.

MINNEAPOLIS
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CONTROL SYSTEMS

R.S.E.S. INAUGURATES VISUAL EDUCATIONAL PROGRAM

NEARLY a year ago the R.S.E.S. International Board of Directors selected a series of sound films to be used as a new educational program now being inaugurated. They were purchased by Virginia Smelting Co. as a contribution to the educational work of the Society. The films are under the supervision of P. B. Reed, International Educational Director and will be distributed to all chapters of the Society as a part of their educational program.

These sound films were sponsored by the U. S. Department of Education and made in Hollywood under the direct supervision of practical refrigeration men in and about Los Angeles. They were designed for use in training refrigeration servicemen, but experienced men will find them very interesting and instructive. Except for the first film, which covers the principles of refrigeration, the films are of the "practical" type, with as little "theory" included as may be necessary.

There are 16 films in the set, grouped into 12 showings. Titles of each, together with their identifying numbers, are listed below. Accompanying each film is a set of slides serving as a basis of discussion after the showing of the film. Time required to show each film varies from 12 to 21 minutes but the film together with the slides and discussion usually require from three-quarters to more than one hour.

The International office plans to rotate these films as quickly as possible. A schedule of showings is being made up now from the requests sent in by chapters.

All servicemen within reach of the scheduled showing are invited by the chapters to attend. For the convenience of the readers the locations, dates and identifying title number of the showings during the next month are listed below. For further information contact the man listed under each chapter at the address given.

Film Titles and Key Numbers

No.	TITLE
360	Principles of Refrigeration
438	Checking The System—Part I
439	Checking The System—Part II
440	Locating and Repairing Leaks
441	Adding or Removing Refrigerant
442	Removing and Installing A Compressor or Condenser
443	Removing and Installing A Cooling Unit
444	Adjusting and Checking The Expansion Valve
445	Checking and Replacing A Float Valve
446	Checking The Electrical System
447	Quieting A Noisy Refrigerator
448	Adjusting and Repairing The Thermo-Expansion Valve
451	Servicing Water Cooled Condensers
449	Adjusting Pressure Actuated Temperature Controls
450	Adjusting Commercial Thermostatic Controls
452	Making and Repairing Tubing Connections

Schedule of Meetings

COLUMBUS, OHIO—Columbus Chapter: No. 360—Meeting of March 13. Contact Mr. Howard Grossman, 22 W. Naghten St., Columbus, Ohio.

DAVENPORT, IOWA — Mississippi Valley Chapter: No. 360—Meeting of Feb. 5; No. 438-9—March 5. Contact Mr. James Vinje, 529 W. Second St., Davenport, Iowa.

DAYTON, OHIO—Dayton Chapter: No. 360—Meeting of Feb. 14; No. 438-9—March 14. Contact Mr. R. E. Warner, Allied Supply Co., 359 W. Monument Ave., Dayton, Ohio.

DENVER, Colo.—Mile High Chapter: No. 360—Meeting of March 18. Contact Mr. R. C. Kimmel, 1524—15th St., Denver 17, Colo.

DUBUQUE, IOWA—Key City Chapter: No. 360—Meeting of March 6. Contact Mr. R. E. Mueller, Stampfer Farm & Home Store, 7th & Iowa, Dubuque, Iowa.

GRAND RAPIDS, MICH. — Furniture City Chapter: No. 360—Meeting of March 5. Contact Mr. M. D. Thiebout, c/o Consumers Power Co., Repair Dept., 450 Market, S.W., Grand Rapids, Mich.

KANSAS CITY, MO.—Kansas City Chapter: No. 360—Meeting of Feb. 6; No. 438-9—March 6. Contact Mr. Cecil R. Visger, 7715 Brooklyn, Kansas City, Mo.

(Continued on page 56)

EQUIPMENT TO BE *Trusted*

The years ahead will bring another fiercely competitive era . . . supply and demand will again be equal . . . goods will sell on the basis of merit, not scarcity.

That's why it is important for you to get set now with refrigeration equipment that can be *trusted* . . . that has under it a sound foundation of dependability, efficiency and acceptance. This will enable you to give the kind of service that builds solid customers in the face of the stiffest competition.

Kold-Hold Serpentine Plate Type Evaporators used individually in banks or fabricated into complete plate stands or cabinet liners, have established their dependability through years of meeting the exacting demands of diverse applications. Kold-Hold Serpentine Plate Type Evaporators provide many outstanding advantages . . . maximum prime surface; highest rate of plate heat acceptance ever attained with natural convection low sides; minimum pressure drop; no possibility of short-circuiting or oil logging; larger "K" factor.

Investigate this better refrigeration now . . . be prepared to give your customers the best service money can buy. Write for the new Kold-Hold Catalog, then let our engineers help you select the equipment for your needs.

Kold-Hold "Hold-Over" Truck Plate Type Evaporators will give you better truck refrigeration, too. Get the facts on how to afford the best possible protection for perishables in transit.

KOLD-HOLD MANUFACTURING CO.
502 N. GRAND AVE. LANSING 4, MICHIGAN

Schedule of Meetings

(Continued from page 54)

LANSING, MICH.—Wolverine Chapter: No. 360—Meeting of Feb. 25; No. 438-9—March 25. Contact Mr. Rial Kellogg, 616 Jessop Ave., Lansing, Mich.

LOUISVILLE, KY. — Colonels Chapter: No. 360—Meeting of Feb. 21; No. 438-9—March 21. Contact Mr. J. M. Berry, F. H. Langsenkamp Co., 339 W. Main St., Louisville 2, Ky.

MADISON, WIS.—Madison Chapter: No. 360—Meeting of Feb. 14; No. 438-9—March 14. Contact Mr. L. A. Miles, Refrigeration Maintenance Corp., 731 University Ave., Madison 5, Wis.

OMAHA, NEB.—Missouri Valley Chapter: No. 360—Meeting of March 21. Contact Mr. C. M. Flohr, c/o United Motors Service, 27th Ave. at Harney St., Omaha, Neb.

ROCKFORD, ILL.— Rockford Chapter: No. 360—Meeting of Feb. 18; No. 438-9—March 18. Contact Mr. Leslie L. Sturch, 1915 Vernon St., Rockford, Ill.

TULSA, OKLA.—Oil Capital Chapter: No. 360—Meeting of Feb. 27; No. 438-9—March 27. Contact Mr. R. W. Palmer, c/o Palmer Supply Co., 820 E. Third St., Tulsa 3, Okla.

LIQUID CARBONIC SPONSORS SERIES OF MEETINGS

THE Liquid Carbonic Corporation is sponsor of a series of meetings for refrigeration service men being held from the Atlantic Coast to the Rockies. These meetings, scheduled from January 21 to April 18, are being held in cooperation with the local chapters of the Refrigeration Service Engineers Society.

A complete program of lectures and visual demonstrations are presented. Cut-away compressors and a condensing unit operating with a glass evaporator reveal what happens within a refrigeration system in operation. Slides are shown to explain various refrigeration circuits and units.

Liquid refrigeration experts conducting the meetings are: John G. Praetz, associate member of RSES, general service manager; George Monjian, former member of RSES, district supervisor, Northwest Region, Fountain-Cabinet Sales Division; and Arthur H. Blanton, cabinet service supervisor, Southwest Region, Fountain-Cabinet Sales Division.

The following subjects are covered:

1. Soda fountain refrigeration systems—their operation, adjustments, and servicing, and Liquid's latest fountain refrigeration systems.
2. Ice cream refrigeration systems—their operation, adjustments and servicing, and Liquid's latest cabinet refrigeration system.
3. Carbonators—operation, adjustments and servicing.

An open forum period on all phases of refrigeration service concludes the sessions.

The program is an outgrowth of meetings held in Chicago and vicinity during November and December of last year and at the Illinois State RSES Convention in Bloomington by John G. Praetz, general service manager, Liquid Carbonic Corporation.

Meetings have been held in Columbus, O.; Cincinnati, O.; Huntington, W. Va.; Louisville, Ky.; Birmingham, Ala.; Atlanta, Ga.; Jacksonville, Fla.; Charlotte, N. C.; Richmond, Va.; Washington, D. C.; Philadelphia, Pa.; Harrisburg, Pa., and New York.

The meeting schedule for future dates is as follows (street addresses of the individual meetings can be obtained by writing the Service Department, Liquid Carbonic Corporation):

Wed., Feb. 20—Boston, Mass.
Mon., Feb. 25—Springfield, Mass.
Wed., Feb. 27—Schenectady, N. Y.
Fri., Mar. 1—Buffalo, N. Y.
Mon., Mar. 4—Pittsburgh, Pa.
Wed., Mar. 6—Cleveland, O.
Thu., Mar. 7—Toledo, O.
Fri., Mar. 8—Detroit, Mich.
Mon., Mar. 11—Saginaw, Mich.
Mon., Feb. 4—Milwaukee, Wis.
Thu., Feb. 7—Madison, Wis.
Mon., Feb. 11—Minneapolis, Minn.
Thu., Feb. 14—Sioux City, Ia.
Mon., Feb. 18—Omaha, Neb.
Thu., Feb. 21—Des Moines, Ia.
Mon., Feb. 25—Cedar Rapids, Ia.
Thu., Feb. 28—Davenport, Ia.
Mon., Mar. 4—Rockford, Ill.
Thu., Mar. 7—South Bend, Ind.
Tue., Mar. 12—Indianapolis, Ind.
Fri., Mar. 15—St. Louis, Mo.
Mon., Mar. 18—Memphis, Tenn.
Thu., Mar. 21—New Orleans, La.
Mon., Mar. 25—Houston, Texas
Wed., Mar. 27—Dallas, Texas
Fri., Mar. 29—Fort Worth, Texas
Mon., Apr. 1—El Paso, Texas
Fri., Apr. 5—Denver, Colo.
Mon., Apr. 8—Wichita, Kan.
Thu., Apr. 11—Oklahoma City, Okla.
Mon., April 15—Tulsa, Okla.
Thu., Apr. 18—Kansas City, Mo.

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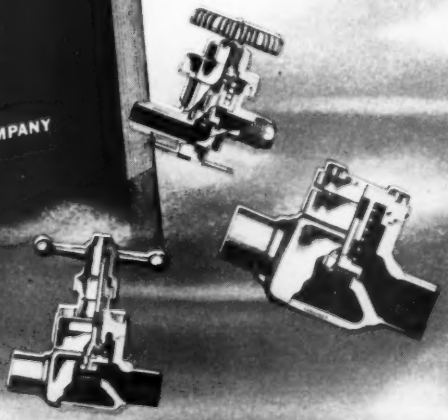

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NIAGARA FRONTIER CHAPTER ANNUAL CHRISTMAS PARTY

Upper left: Beaming in the picture is Leon McCormick who acted a perfect part of Santa Claus. Also in the same picture is Kenneth Schmidt. Lower left: is a general view of the party. Upper right: is a picture of Spike Jones' substitutes and a fine bunch of musicians. Left to right is Mrs. Orsolits, the director, Bill Geackel, Harold Swan, Sara Geackel and Mrs. Grabenstatter. Lower right: is our well-known quartet. Reading left to right are Messrs. Clark, O'Hara, Jorden and Schmidt.

NIAGARA FRONTIER CHAPTER CHRISTMAS PARTY

THE Niagara Frontier Chapter held its Annual Christmas Party December 16th in the Hotel Sheraton, Buffalo. A splendid turkey dinner with all the trimmings was served which placed the guests in just the right mood to make the balance of the evening a very enjoyable one. A door prize drawing of war savings stamps followed by a distribution of gifts from Santa Claus started the evening off and judging from the gifts received, he must have been a real Santa Claus. Next on the program was a band on the order of Spike Jones, including all the washboards, frying pans, mixing spoons, mouth organs and whistles. Then came the famous "barber shop quartet" of the Niagara Chapter.

A party for the children was held December 22nd. Leon McCormick played the part of Santa Claus and the entertainment for the children consisted of a program of movies especially selected for children. The children sang Christmas carols, then Santa Claus distributed some swell gifts including a bag of candy and a very scarce item these days, a candy cane.

LONG BEACH CHAPTER ANNUAL DINNER DANCE

WAITING since pre-war days for another of those enjoyable annual dinner-dances, proved worthwhile for one hundred members and guests who attended the gala affair Tuesday, December 4 at the Lakewood Country Club.

President Leslie Gould opened the program by introducing Jimmie Dean, Master of Ceremonies, who in turn introduced the members of the Armed Forces present along with the men who had recently returned and also several distinguished guests.

The entertainment was furnished by the pupils of the Harry Morris Studio of Dancing; their performances were very little short of professional standards. Most of the men present let their steaks get cold because of the fashion show presented by Miss Kay of the Robert Edwards School of Modeling and several of her pupils.

Cash door prizes were won by Miss Hankey, Mr. and Mrs. Lindley, Mr. T. M. Langwell and Mrs. Frank Sigrist. The awards offered by the supply houses for refrigeration servicemen went to Charles Makszus, J.

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Thermal Expansion REFRIGERANT VALVE

- **Thoroughly field-tested** for Freon, Methyl Chloride and Sulphur Dioxide.
- **Easily-removed** orifice cartridges eliminate need for stocking several sizes for low tonnage installations.
- **Ample** diaphragm plus balanced, low-rate adjusting spring.
- **Carefully-lapped** hard-faced ball insures tight shut-off.
- **Frictionless** pusher pin.
- **Semi-liquid charged;** may be placed in ambient temperatures higher or lower than bulb temperatures with no loss of control.
- **Unmatched** sensitivity.

For complete specifications on the V-200 and other refrigerant controls in the broad GENERAL CONTROLS line, write for your copy of Catalog 52B. Send request to your nearest GENERAL CONTROLS branch, distributor or refrigeration supply house.

Interchangeable **Orifice Cartridges**

Permit Proper Sizing ***on the job!***

CARTRIDGE NUMBER	CAPACITY IN B.T.U. PER HOUR		
	FREON	METHYL CH.	SULPH. DI.
1	750	1700	1710
2	1500	3400	3420
3	3000	6800	6840
4	6000	13600	13700
5	9000	20400	20500
V-300 VALVE WITH NO CARTRIDGE	12000	27204	27400

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801 ALLEN AVENUE GLENDALE 1, CALIF.

FACTORY BRANCHES: ATLANTA • BOSTON • CHICAGO • KANSAS CITY • DALLAS • DENVER • DETROIT • PHILADELPHIA • NEW YORK 5—1 CLEVELAND • SAN FRANCISCO • HOUSTON • SEATTLE • PITTSBURGH • *DISTRIBUTORS IN PRINCIPAL CITIES*

K. Walker, Frank Sigrist, Clayton Hunter and Robert Schooler.

The program committee, consisting of Hasket Neel, Everett Brown and Fred Riley, was given a big hand for the hard work and many hours they put in on the arrangements.

Dancing to the music of the Harry Morris orchestra continued to the wee small hours and it was evident that everyone had a swell time and is looking forward to the next of these happy events.

* * *

NEW CHAPTERS IN THE MAKING

METROPOLITAN NEW YORK CHAPTER

ON December 14 a group of 17 men attended a meeting for the purpose of considering the formation of a chapter to be known as the Metropolitan New York Chapter. Committees were selected to carry on some of the formation work.

A second meeting was held on January 11th at which 34 members signed the petition for charter. The election of officers was held with the following results: Mr. Fred Asselmeyer, *President;* Mr. Jacob Firester, *First Vice President;* Mr. Bernard Krasner, *Second Vice President;* Mr. John Mulqueen, *Secretary;* Mr. Fred Worthington, *Treasurer;* and Nathaniel Gordon, *Chairman* of the Educational Committee.

The Constitution and By-Laws were discussed and approved unanimously at this meeting, and it was agreed to hold monthly meetings on the second Friday of each month.

CHARLESTON CHAPTER

A meeting of refrigeration service men of the Charleston area was held November 9th at the Charleston Boat Club for the purpose of forming a chapter of the Refrigeration Service Engineers Society. Messrs. Gruber and Brunton, President and Secretary respectively, of the Tri-State Chapter were present to aid in the formation. The meeting was called to order by V. K. Gaskins who introduced Mr. Brunton and requested that he act as temporary chairman.

The National Constitution and By-Laws was adopted by unanimous vote and then nominations for temporary officers were received from the floor. The election resulted in the following: Harry G. Frame, *President;* L. C. Black, *First Vice President;* E. P. Whisenhunt, *Second Vice President;* L. E. Von Woglom, *Secretary;* V. K. Gaskins, *Treasurer.* The Board of Directors elected are: Mr. R. H. Amick, *Chairman,* and Messrs. Wiley, Burnell, and Sankey. Roy C. Sweeney was elected *Sergeant-at-Arms.*

Harry Frame then relieved Mr. Brunton of the chair and proceeded with the appointment of committees. In the business session that followed annual dues were set at $12 per member per year with the fiscal year beginning July 1st. Meetings will be held on alternate Tuesdays until further notice.

A second meeting was held January 8th at the Daniel Boone Hotel in Charleston. Sixteen members were present and meeting dates were further specified as the second Tuesday of each month at 8 P.M. Two more Board of Directors were elected at this meeting and two additional committees.

A future educational program got under way with arrangements for the exhibition of films provided by the National Society. An educational program of the evening included the reading of two questions from the Question Box in THE REFRIGERATION SERVICE ENGINEER. After a rather lengthy discussion of the trouble presented, the solution as published was read. It was felt that this little program provided some worthwhile "skull practice" and interesting debate.

ROCHESTER CHAPTER

A meeting was held recently in Rochester, N. Y., to consider the formation of a chapter to be known as the Rochester Chapter. Forty-seven men to date have signed the petition for charter and temporary officers have been elected to carry on the formation meetings. These officers are George Davenport, *President;* John Eggleston, *Vice President;* and James A. Stevenson, *Secretary-Treasurer.*

HURON VALLEY CHAPTER

Eighteen men from the vicinity of Ann Arbor and Ypsilanti, Michigan, met and signed a petition for charter recently to form a chapter to be known as the Huron Valley Chapter. Robert C. Simmons of Simmons Refrigeration Engineering, 1124 Granger Avenue, Ann Arbor, Michigan, is taking the lead in the formation work. Meetings thus far have been held in Ann Arbor.

WESTCHESTER COUNTY CHAPTER

A petition for charter was signed by ten men from the county of Westchester in New York, December 25th. It was decided at this

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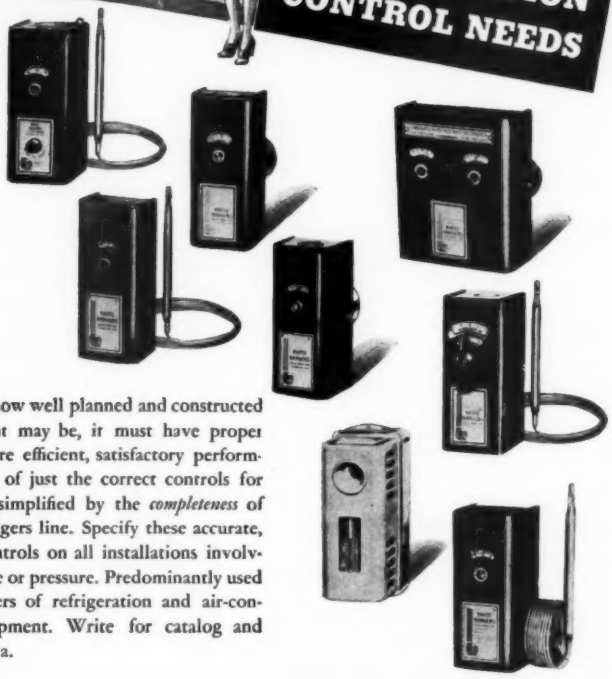

Regardless of how well planned and constructed your equipment may be, it must have proper control to assure efficient, satisfactory performance. Selection of just the correct controls for your needs is simplified by the *completeness* of the White-Rodgers line. Specify these accurate, dependable controls on all installations involving temperature or pressure. Predominantly used by manufacturers of refrigeration and air-conditioning equipment. Write for catalog and installation data.

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meeting that the chapter should be known as Westchester County Chapter. Those signing the petition are: Messrs. Irving Isaacs, Michael P. Schlosser, Michael A. Ferraro, Henry M. Scott, Clifton Pendelton, Vincent Gencarelli, Joseph Congello, Fred Klenk, Philip Gottfried, and Sol Goldowsky.

AZALEA CHAPTER

A petition for charter to form a chapter known as Azalea Chapter was forwarded to the National Society, December 21st. Sixteen men of the Mobile, Alabama, area signed the petition. They are as follows: J. A. Robertson, Leon McMullan, A. D. Johnson, Jr., W. N. Hill, Louis M. Founds, Jacob S. Donald, Frank D. Crow, Percy C. Clements, H. C. Bates, Walter Lee Anderson, P. J. Alfaro, Hubert W. Patton, Charles R. Pettus, George M. Elliott, Floyd E. Walleker, and C. W. Crull. Acting Secretary of the new chapter is J. A. Robertson, 455 S. Broad Street, Mobile 21, Alabama.

R.S.E.S. Chapter Notes

KANSAS CITY CHAPTER

Kansas City, Mo., Jan. 2—During the business session of the evening, dates for the certificate examination and other special meetings were discussed. The greater part of the evening was devoted to the annual election of officers; the results of which were as follows: A. M. Hoover, *President;* Frank Brown, *First Vice-president;* Cecil R. Visger, *Second Vice-president;* Robert S. Huston, *Secretary;* Leroy A. Anderson Jr., *Treasurer;* Albert C. Taylor, *Sergeant-At-Arms;* Directors are Messrs. Merle L. Ferguson, Floyd C. Smith and George T. Rostock.

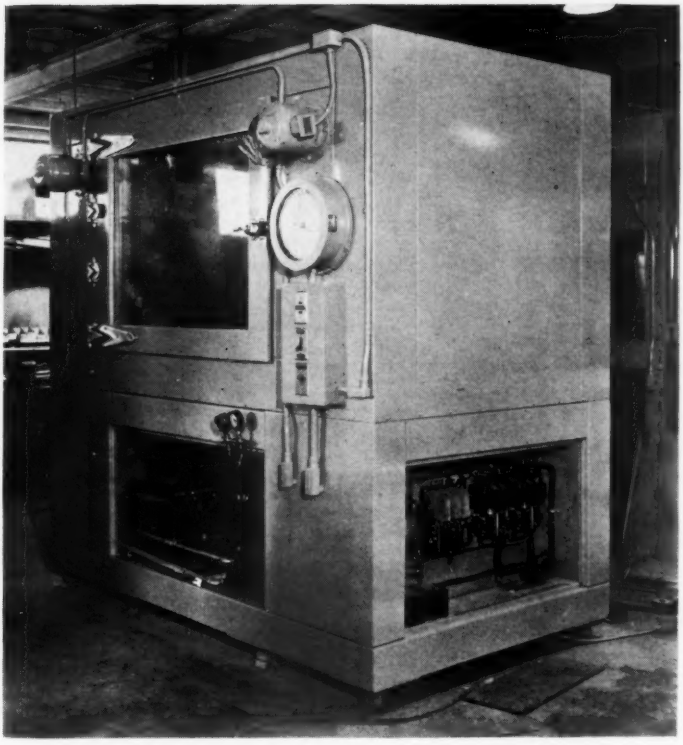
KEY CITY CHAPTER

Dubuque, Ia., Nov. 7—At the invitation of Bob Miller, the chapter held its meetings at the Stampfer Farm and Home Store. During the meeting, Paul Narr gave an interesting talk on his experiences in Alaska. After the meeting, Bob Miller served refreshments supplied through the courtesy of J. F. Stampfer Co.

Dec. 5—Messrs. Daly and Trask of Frigidaire were guests for the evening. They presented an illustrated talk on home freezers, the proper method of preparing and wrap-

CHICAGO CHAPTER BANQUET

Chicago Chapter held its Annual Banquet and Dance Jan. 19 at the Midland Hotel, Chicago. 133 were in attendance. At the Speakers' table are the newly elected officers of the Chapter who were installed in office following the Dinner.



The Hi-Low Testing Chamber Used by the Admiral Corporation

"FREON-22" Produces Sub-Zero Temperatures in New Product Development Work

AT THE Admiral Corporation plant in Chicago, Ill., "Freon-22" is utilized in a Hi-Low machine in which, during the war, tests were made on radio and radar equipment in simulated high-altitude temperatures.

Extremely low temperatures were held constant for periods as long as 12 hours. Specimens remained in the cabinet for a full week to insure thorough testing through temperature range of from + 85°C to – 55°C.

The machine, manufactured by the Kold-Hold Co. of Lansing, Mich., operates automatically. It records the temperature and permits exacting study of the effect of temperature cycles upon various materials.

Now application of low temperatures obtained with "Freon-22" is enabling Admiral Corporation to continue research in the development of new products.

Today—when sub-zero refrigeration is required for research, tests or in manufacturing operations—"Freon-22" is widely used to produce those temperatures efficiently, economically and safely. Write for complete information. Kinetic Chemicals, Inc., Tenth and Market Sts., Wilmington, Delaware.

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safe refrigerants
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ping products for storage and constructional features. Following adjournment of the evening, lunch was served by J. F. Stampfer Co.

WOLVERINE CHAPTER PARTY

The smiling group pictured above are those who attended the recent Wolverine Chapter party. There was dancing to the music of Albert Gay, while others in the group spent the evening playing cards. The grand prize of the evening was a Mix-master won by Jim Rundle, the only single man present. William Meddler of the Gilmer Belt Co. was a guest. A buffet lunch was served.

BOSTON CHAPTER

Boston, Mass., Dec. 11—New members accepted by the chapter at this meeting included the following: Messrs. John P. Fahey, Philip E. Taylor, Raymond J. Ghizzoni, George C. Morgan, Charles C. Barrows, Sr., and Charles Larsen. In addition to those accepted, applications were received from the following and referred to the investigating committee: Messrs. Victor DeGirolamo, Elwin F. Young, Robert Traynor, James P. Souza, and Nelson B. Nickerson. Arrangements were made during the course of the business session to provide a meeting place for the Liquid Carbonic Corp. meeting at which time a talk and a movie on servicing and installing soda fountains would be presented. It was suggested that the Worcester and Providence Chapters be invited to attend this meeting. The annual election of officers resulted in the following: Edward Hoyt, *President;* James McCue, *First Vice President;* William Paulin, *Second Vice President;* J. J. Madden, *Business Secretary;* Robert Allen, *Recording Secretary;* Chester Sherman, *Treasurer;* George Champoux, *Sergeant-At-Arms;* Bertil Stenmark, *Chairman, Education Committee.* Board of Directors is composed of Messrs. Lester Pierce, Otto B. Stein, Herbert S. Swanson, Gerald Bradford, A. O. Alexander and George Daley. On the educational program for the evening, Mr. Shea discussed unique methods of drying out windings on electric motors which had been damaged by floods.

Jan. 8—New members accepted by the chapter at this meeting included the following: Victor DeGirolamo, Elwin F. Young and Robert Trainor. New applications were received from Lawrence E. Austin and Harold P. Conant. The newly elected officers were installed in their respective offices and President-elect Edward Hoyt assumed control of the meeting. The chapter welcomed back Sydney Ashe, just returned from overseas duty in England. The meeting was turned over to William Paulin, Chairman of the Educational Committee, who introduced Mr. Edgar of the White Rogers Electric Co. of St. Louis. Mr. Edgar gave an interesting and instructive talk on controls.

PITTSBURGH CHAPTER

Pittsburgh, Penna., Oct. 26—Announcement was made at this meeting of a special meeting to be held March 4th at which time the Liquid Carbonic Company would present a discussion and movies on soda fountains and ice cream cabinets. John G. Praetz, General Service Manager of the Company, will be the speaker.

Nov. 30—Ken Newcum of the Superior Valve and Fittings Co. was the guest for the evening and he gave an interesting discussion on recent developments of refrigeration accessories. His discussion included developments made by his company on various types of valves that would permit silver soldering without damage to seats or other parts of the valves. Check valves that will operate without chatter, liquid indicators with entirely new features, compression valves, dehydrators, heat exchangers and a very unique quick coupler which is part of a charging line used on the highside or lowside of the system. Mr. Newcum stated that their products included many practical ideas for the service man. The final offering by Mr. Newcum was a preview of a new product to be released shortly, known as the "Stay Tite Flare Nut."

TWIN CITIES CHAPTER

Minneapolis, Minn., Dec. 4—The entire meeting was devoted to business matters of the chapter during which various reports were received from committees and two new members, Jess Wood and Alfred Hammer, were accepted to membership. Annual elec-

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For specifications or other information on G-E equipment, get in touch with us. We'll be glad to help. *General Electric Company, Air Conditioning Dept., Section 6712, Bloomfield, N. J.*

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- ★ Cube Ice Makers
- ★ Conditioned Air Cooling Units

GENERAL ELECTRIC

AIR CONDITIONING . . .
COMMERCIAL AND INDUSTRIAL REFRIGERATION

tion of officers resulted in: Dean S. Holmes, *President;* Otto Chermak, *First Vice-President;* Ubert Hanson, *Second Vice-President;* George Gartner, *Secretary;* Milton Swanson, *Treasurer;* Glen Schwarting, *Sergeant-at-Arms.* Board of Directors elected were Irwin Baldwin, Les Findley and Gaylord Randall.

WYOMING VALLEY CHAPTER

Wyoming, Penna., Dec. 10—Because of a poor attendance at this meeting the annual election of officers was postponed. Urgent business matters were discussed and the meeting closed at an early hour.

MILE HIGH CHAPTER

Denver, Col., Nov. 19—The attendance at this meeting was small and business matters were postponed to the next meeting. Lyle Smith conducted a question and answer program which became quite lively and interesting. He also announced that the speaker for the December meeting would be an ex-service man from the Navy who would discuss refrigeration aboard ship.

Dec. 17—There was considerable business to be accomplished during this meeting among which was the discussion and decision to hold examination for Certificate Membership at an early date. The matter of forming a Woman's Auxiliary was postponed until the women themselves could discuss the matter. Warner Burbank was appointed a committee of one to represent the Mile High Chapter in writing up a refrigeration code for Denver and Colorado. Kenneth E. Morriss, formerly a member-at-large and recently returned from the Navy was transferred to chapter membership. In addition new members received by the chapter included Messrs. Meir, SaBell, Ritchie, Clement, Bach, and Knight.

LONG BEACH CHAPTER

Long Beach, Calif., Jan. 9—The meeting opened with the serving of a delicious Irish stew dinner by Mr. and Mrs. Ed Murphy and assisted by R. J. Sexton. During committee reports announcement was made of the formation of a State Association. Meetings of the Association are to be held in Fresno on the 2nd and 3rd of February. L. K. Willis gave a report on the Apprenticeship Training Program and on the starting of a night school for those men of the district associated with the industry. Ira Hammer gave a preview of the February 13th meeting at which the Imperial Brass

LONG BEACH CHAPTER

The Long Beach Chapter meeting of January 9 drew an attendance of eighty-five members and added another to the long list of highly successful, well attended meetings of this chapter.

The educational feature of this meeting was a discussion led by John Schlemmer of General Controls Co., on the subject of "Superheat" in which he used a glass evaporator in operation to illustrate his talk. Superheat was first defined by Mr. Schlemmer, then the evaporator was placed in operation so that the action of the refrigerant can be observed as it passes through and is superheated.

In the upper picture, Mr. Schlemmer is standing by the glass evaporator. The lower picture shows most of the members in attendance at the meeting.

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The men who build Logan Lathes place a premium on precision. From their own daily experience in building precision machines they know how vital accuracy is. Not only Logan executives and engineers, but also the men in the shops, share in an all out determination to keep the Logan Lathe the most accurate in its field. This unflagging accent on accuracy from the first assembly to the final testing has done more than anything else to make the Logan Lathe outstanding in precision as well as in rugged strength. It explains, too, why so many industrial executives are depending on Logan Lathes both in tool rooms and on production lines. Ask your Logan Lathe dealer, or write for full information on all models of Logan Lathes.

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No. 200 Back Geared Screw Cutting Lathe

BRIEF SPECIFICATIONS common to all Logan Lathes: Swing over bed, 10½"; Bed width across ways, 6-15/16"; Bed length, 43⅛"; Size of hole through spindle, 25/32"; Spindle nose diameter and threads per inch, 1½"—8; 12 Spindle speeds . . 30 to 1450 r.p.m.; Size of motor . . ⅓ or ½ h.p., 1750 r.p.m.; Preloaded precision ball bearing spindle mounting; Drum type reversing motor switch and cord; Precision ground ways, 2 prismatic "V" ways, and 2 flat ways.

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Company will present the educational feature including a tube bending contest.

BIRMINGHAM CHAPTER

Birmingham, Ala., Dec. 5—The meeting was held in the quarters of Flint Refrigeration Company. A report on the financial status of the recent convention was made by Mrs. Gennett followed by a report by the secretary on the state of the chapter finances. Ten applications for membership were reported by the membership committee and the standards committee opened up for discussion codes and standards for membership. Future meetings were discussed by the educational committee among which were arrangements to combine the Social Meeting for January 28th with a meeting to be conducted by Liquid Carbonic Company making this a dinner meeting.

Jan. 5—Considerable time was devoted to the discussion and arrangements for the forthcoming dinner meeting. After other business matters had been taken care of the meeting adjourned.

FAIRFIELD COUNTY CHAPTER

Stratford, Conn., Jan. 14—New applications for membership were received from Messrs. Josephe Luish, William Peterson, Richard Williams and James Acton. After other business matters had been taken care of the meeting was turned over to the Educational Committee for discussion on future educational programs. Since the majority seemed to wish more information on controls, it was decided that meetings should be devoted largely to this subject.

COW TOWN CHAPTER

Fort Worth, Tex., Jan. 17—The recommended Apprenticeship Training Standards as outlined by the Service Improvements Advisory Committee were read and discussed. After some discussion the chapter voted to control the sale of R.S.E.S. advertising material to its members and that any orders for these materials should have the signature of an officer of the chapter before the order would become valid. The secretary of the chapter announced that no code is being planned for the city in the immediate future, but that the city offices had suggested the chapter draw up a code and submit it for further action. Acting on this suggestion a code committee was elected to consider the details and arrangements.

Arrangements were made for a Certificate Examination to be held in the near future and eleven members indicated their desire to take the examination. On the educational committee, C. E. Boren of Ranco, Inc., gave an instructive talk on the various types of controls.

TRI-COUNTY CHAPTER

Aurora, Ill., Jan. 12—A fried chicken dinner was served to members of Tri-County Chapter and their wives, Saturday evening, Jan. 12th at "The Bierstube" in Aurora.

After dinner a pleasant hour was enjoyed viewing a well selected group of sound films.

The following officers were elected for the ensuing year: Harry I. Spring, *President;* Ralph May, *Vice President;* B. V. Clark, *Secretary-Treasurer;* Harold Ellis, *Sergeant-at-Arms.* Board of Directors elected were: Fred Johansen, Arnold Lohbauer, and R. C. Marquis.

WYOMING VALLEY CHAPTER

Wilkes Barre, Penna., Jan. 14—A warm welcome was extended to Jack Bremer, just returned after 5 years of military service. The new educational program and arrangements for the Certificate Examination were explained for the benefit of members absent at the previous meeting. The nominating committee report touched off considerable discussion and Mr. Selena refused to accept nomination, thanking the members for the opportunity to serve. In the final results of the election of officers, those elected were: Thomas Hughes, *President;* Walter Walls, *Vice President;* Lewis Harris, *Secretary;* Frank Schultz, *Treasurer.*

SAN DIEGO CHAPTER

San Diego, Calif., Jan. 3—After dinner was served the business meeting was called to order. The results of the annual election of officers were: M. Wampler, *President;* K. H. Young, *Vice President;* M. R. Hanks, *Secretary-Treasurer;* Otto Williamson, *Sergeant-at-Arms.* Board of Directors elected were Tom Bennett, G. S. Cole, E. A. Davis, William Fickler and A. P. Hoine.

W. W. Allison, a member of the National Board of Directors, spoke on the results of the recent Board of Directors' meeting. He also discussed the forthcoming California State Convention to be held in Fresno in February. On the educational program, insulation was discussed by Ed. Asproth, a guest, and members R. L. French and H. E. Friedrichs. This discussion was followed by an open forum devoted mostly to the same subject.

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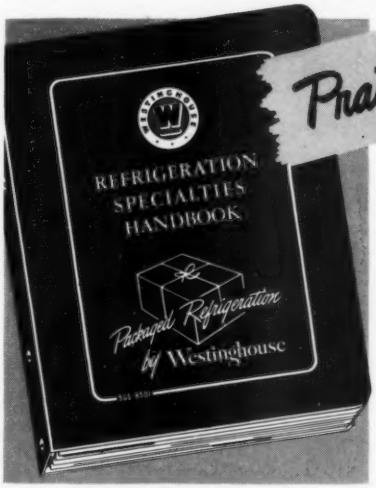

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Westinghouse supplements a fine *packaged* product line with proved selling plans, technically developed application data, complete service assistance—the kind of selling help dealers need to do a profitable commercial refrigeration business.

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A Complete Line of Refrigeration Specialties Products

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EASY TO APPLY—Simplified application charts to make your job easy. Sizes and models for all applications.

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VIEWS OF THE CLEVELAND CHAPTER 7TH ANNUAL CHRISTMAS PARTY

CLEVELAND CHAPTER

Cleveland, Ohio, Dec.—Following the custom of our Cleveland Chapter at this time of year, our regular December meeting was replaced by our 7th Annual Christmas Party. This party is given each year by our Chapter for the express purpose of making the children of our members happy and giving them a good time. And boy, what a party! A full hour of kiddies' talkies, a big turkey dinner for each one, a box of candy and presents for all, and magicians with lots of tricks.

The dinner was held at The Cleveland Engineering Society Building Dining Room, where an even one hundred dinners were served. After the meal we went to the Auditorium which was nicely decorated for the party. We were host to 30 children ranging in age from two to twelve years.

All women present were given a corsage and after the kiddies had their fling, door prizes were drawn and a general good time was had by all.

We wish to thank Dick Hollingsworth and his committee for the fine arrangements they made for this party. The very useful and beautiful door prizes were donated by the Supply Houses, and we want to thank Karl Debes, Jim Downs, Mr. Pruske, and George Baumgardener for these. The pictures were taken by Ted Quinn of Refrigeration Industry.

Dec. 11—An educational feature of the evening was the showing of movies by Mr.

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and Mrs. Kolus. The film was a travel movie of the Pan American Highway and of Norway sketches. The educational program contained an interesting talk by Elmer Wiedwald, a representative of the Sprague Products Company, on motor parts and condensers. Committee reports included a report on the Christmas Party and forthcoming educational meetings.

Jan. 8—After the business session was complete, educational chairman, O. D. Herrick introduced I. Kramer of Kramer-Trenton Co., who gave an interesting talk and demonstration aided by slides on Kramer product Thermobank.

The educational chairman outlined the educational features planned for meetings from the first of the year until June of this year.

OIL CAPITOL CHAPTER

Tulsa, Oklahoma, Dec. 12—New officers were elected at the regular monthly meeting of the Chapter. The meeting was at the Michaelis Cafeteria, Tulsa, Oklahoma.

Mr. Noland I. McKee, whose name was written in on the ballots was elected President for 1946. Other officers elected were E. J. Coday, Vice-President; Clyde, L. Copp, Treasurer; Carl Maloy, Secretary, and Mr. V. W. (Bill) Hocker, Sgt. at Arms.

The chapter has been holding regular dinner meetings each month and through the efforts of the former officers, K. G. Wight, R. W. Palmer and E. H. Churchwell, has grown into an organization which represents the majority of the refrigeration firms in the Tulsa area. The dinner meetings have set a date which brings the members of the refrigeration industry together and the entertainment following the business meeting has set a foundation for much better cooperation and friendship between the members of the organization.

S S S

Ladies Auxiliary

ROCKFORD AUXILIARY

Rockford, Ill., Dec. 17—In spite of the sub-zero weather, members of the Rockford R.S.E.S. Auxiliary gathered at the Faust Hotel for their annual Christmas party on December 17th. After a short business meeting, lovely gifts were drawn from a grab bag. The evening was topped off by an appropriate Christmas lunch, and a good time was had by all.

KANSAS CITY AUXILIARY

Kansas City, Mo., Dec. 5—A large part of the evening was devoted to business matters of the chapter after which an annual election of officers took place. Those elected were Katherine Anderson, *President;* Hazel Brown, *Vice President;* Maxine Haller, *Secretary;* Ruth Ferguson, *Treasurer,* Louise Huston, *Sergeant-at-Arms.* Board of Directors are Mesdames Mendenhall, DeWilde and Fox.

TWIN CITIES AUXILIARY

Minneapolis, Minn., Dec. 4—The meeting was held in the home of Mrs. Fred Phillips and during the business session the chapter decided to have their charter framed, appointing Mrs. Schwarting to secure a suitable frame. It was suggested that suitable topics of interest to the ladies be arranged for each meeting of the coming year and further arrangements were tabled for the next meeting. The election of officers resulted in Mrs. L. A. Ost, *President;* Mrs. Dean Holmes, *Vice President;* Mrs. Ubert Hanson, *Secretary;* Mrs. Glen Schwarting, *Treasurer;* Mrs. George Beardsley, *Sergeant-at-Arms.* Refreshments were served following the meeting.

NIAGARA FRONTIER AUXILIARY

Buffalo, N. Y., Dec. 7—Plans for the Christmas Banquet and children's party were discussed with arrangements being planned for a later date to complete preparations.

The Christmas Banquet was held December 15th and according to the report was a terrific success, even though a heavy snow storm was raging the night the party was held.

On December 23rd, the children's party was held with Santa Claus present to hear all requests and give a present of candy to each child. Movies were shown the children with ice cream and cookies to wind up the affair.

A new member, Mrs. O'Rourke, was welcomed to the auxiliary January 11th and during this meeting the annual election of officers was held, resulting in the following: Mrs. Ralph Davis, *President;* Mrs. Thomas Jordon, *Vice President;* Mrs. Leon McCormick, *Secretary;* Mrs. William Goeckel, *Treasurer;* Mrs. A. H. Keirn, *Sergeant-at-Arms.* Board of Directors are Mrs. E. Orsolits, *Chairman;* Mrs. W. Bobzien, Mrs. John Bush, Mrs. J. Muller, Mrs. O'Rourke and Mrs. S. Szyszkowski.

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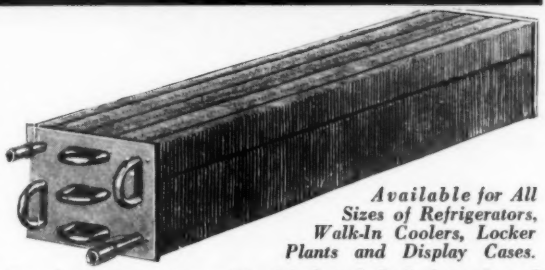

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New and Improved Appliances

Addresses of Manufacturers represented in this department can be obtained from the Editor

Nu-Braze Wonderflux

SOMETHING quite revolutionary in silver-brazing fluxes has been developed and is now available for use in civilian production.

This flux known as Nu-Braze Wonderflux No. 4 melts and forms a protective coating over the metal surfaces at 480° F, well below the oxidation temperature of most metals. Thus, this flux eliminates oxides by actually preventing their formation.

At 800° F, the point where ordinary brazing fluxes first begin to melt, Nu-Braze Wonderflux is actually water-thin, and will readily flow through clearances as close as .001".

Possessing an unbelievable thirst for oxides, this flux is especially effective on stainless steels.

It has a p^H of 5-6 which means that for all practical purposes it can be considered completely neutral. Thus, it can be painted on parts and allowed to remain for long periods without producing corrosion. Since it is non-hygroscopic, should some of this flux remain trapped in an inaccessible part of the joint, it would not pick up water at a later date and thus cause corrosion.

Because it is water-thin at its operating temperature, this flux is gently and completely eased out of the joint by the molten brazing alloy, thereby eliminating the ever-prevalent headache of flux inclusions in brazed joints.

After it is melted, the flux hardens to an extremely brittle glass which can usually be jarred from the brazed part. It is easily removed by either hot or cold water.

Another widespread objection to ordinary fluxes is the continuous effervescence which takes place during the heating cycle. After the water content leaves Nu-Braze Wonderflux at 212° F, there is no further effervescence. This quality makes this flux especially useful where brazing alloys are used in the form of powder, since this flux will not spatter the alloy powder away from the joint area.

This flux contains no free fluorides and does not release the objectionable volumes of noxious fumes as do ordinary silver brazing fluxes. Because it is a neutral composition Nu-Braze Wonderflux is perfectly safe to handle and will not attack the skin.

All Metal Hammers

ELIMINATING the weakness of conventional wood handles in ball-pein hammers, these new hammers give greatly prolonged life, greater safety and perfect, dynamic balance.

Hammers for Welding

Heads are of finest alloy tool steel, flame hardened for toughness. Several models are now available in a variety of sizes. Flex-o Handgrip, shaped to fit the hand, absorbs shock of hammer blows. All-steel handle is unbreakable, can't burn or split and will never come loose from hammer head, for there are no wedges to come out.

Safety is promoted because heads will not fly off, nor get out of alignment with hammer handle. More wallop with less muscular effort due to balanced weight distribution.

The cost of these hammers is slightly more than the conventional type, but they represent economy due to prolonged life of service.

"Thors" Anti-Frost Compound

STANCO Inc. announced today the development of "Thors," a double-duty anti-frost compound for use on freezer doors and refrigerator coils of cold storage plants, freezing rooms and lockers. "Thors" prevents the sticking of freezer doors and acts as a sealer on contact surfaces to prevent leakage. It aids in the removal of ice and frost built up on refrigerator coils.

Made of petroleum base, "Thors" has a light color and soft consistency. It is applied easily by brush or swab. Designed for use on metal, the product possesses anti-rust properties. In thin films, it has insignificant effect on heat conductivity.

"Thors" eliminates the jamming, sticking and leakage problems of freezer doors. The contact surfaces are freed of frost, rust, scale and water before applying by brush or swab. One to two pounds of product usually suffices for treating the contact surfaces of a door in winter and summer, respectively. The frost formation is brushed off as required, about once a week. The defrosting may be repeated up to six times before renewal of coating becomes necessary.

According to the manufacturer "Thors" cuts the defrosting time for refrigerator rooms with single coils by more than one-half. The product is applied to frost-free pipe at the rate of about 1.4 pounds per 100 linear feet of two inch diameter pipe, leaving a thickness of only 0.005 inch. Forty pounds will effectively treat 2900 feet of pipe in a freezer room. Smooth pipe is easily coated by gloved hand, holding fingers around the circumference. Double and triple bank systems are not amenable to this treatment. Tapping with

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A "throw-away" pressure relief device for small air conditioning and refrigeration units. Price is so low that when over-pressure breaks the rupture disc you will generally find it cheaper to throw away the complete "Midget" and install a new one than to renew the rupture disc in a conventional type SAFETY HEAD. Rupture Disc installed, pressure tested and sealed at the factory.

Brass Body. 1/4", 3/8" and 1/2" connections
Rupture Disc of silver or coated aluminum
. . . bursting pressures from 150 to 500 lbs.

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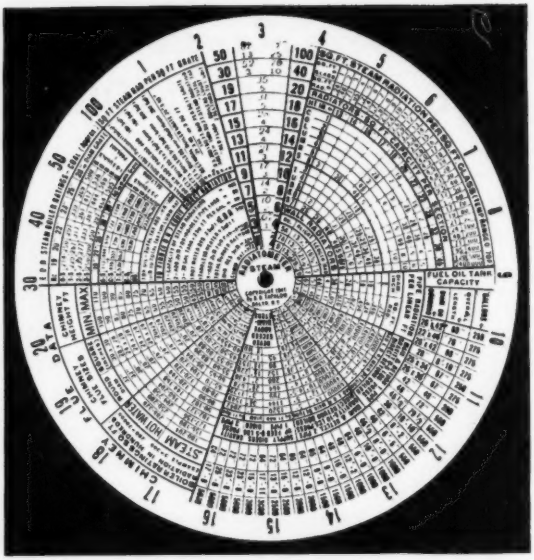
wood or mallet generally removes the ice and frost formation from pipe treated with this compound, largely eliminating hand scraping. Sufficient coating remains on the coils to allow several defrostings.

Heat-O-Meter

A NEW calculating device for measuring radiation for steam and hot water heating systems has been announced ready for public distribution after several years of research and use by heating authorities.

It is claimed this new calculating device Heat-O-meter (physically a round dial with three concentric celluloid printed discs) eliminates the tedious figuring, usually necessary to determine the correct amount of radiation, and can successfully and easily be used by anyone without previous technical training as its operation is rapid, not involving subtractions, divisions, complicated multiplication, nor the use of a formula. Just the simple turning of a dial and the correct answer is received.

It is also stated that this dial contains sizes of mains, returns, risers, radiator sizes and capacities, round and sectional boiler net ratings, chimney flue sizes and capacities with minimum and maximum heights, hot water tank sizes and capacities, fuel oil tank sizes and capacities, hot water generator capacities and other valuable heating information enabling plumbers, steamfitters, architects, builders, oil burner and heating salesmen and all individuals who come in contact with heating problems to have the correct answers at their finger tips.



Heat Calculator

News From— The Dispatcher

ALEX GORDON, former secretary of Chicago Chapter has moved to Los Angeles, Calif., where he will seek employment and a permanent address.

O'Bannon Bros., the Refrigeration and Electrical Supply Company now located at Terminal Warehouse, will erect a $60,000 warehouse and sales headquarters at 1300 East Sixth Street, Little Rock, Ark., D. A. O'Bannon announced. Permit has been issued. Ginnochio and Cromwell, Little Rock, are the architects. The building will be a one story, masonry construction, 140x152 feet with loading dock. O'Bannon Bros. are agents for General Electric products, refrigeration and electrical supplies. Construction materials are handled by the Refrigeration and Electrical Supply Co. Karl H. Miller and Julian Simpson are the operators.

A certificate of partnership has been filed in Buffalo, N. Y., for the Frontier Refrigeration Co., 904 Main St. Partners are David M. and Margaret M. Zimmerman and Paul B. Readett.

Articles of incorporation have been filed in the Wisconsin Secretary of State's office at Madison for Master Refrigeration Sales and Service Company, Milwaukee. Incorporators were Ellsworth F. Anderson, Doris Anderson, and John M. Hanley.

Incorporation papers have also been entered for Masterfreeze Corporation, Village of Sister Bay (same incorporators as Master Refrigeration Sales and Service) and for Miller Distributing Company, Inc., Marshfield. The latter concern will "purchase and sell frozen and other foods." Incorporators were L. A. Miller, H. M. Miller, and H. E. Scheibe.

"FARTHEST NORTH" in Modern Refrigeration

Write for catalogs, engineering assistance, or a representative to call.

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Good news! Glass filler coolers for cafeterias; bubbler coolers for offices, stores, factories; and commercial coolers for all applications . . available now without priority. Complete models and sizes.

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ST. LOUIS — R. H. Spangler, 3331 Market St. • ATLANTA, GA. — J. E. Parker 294 Peachtree N. E.

SCHOOL ROUNDING OUT 20 YEARS OF TRAINING MEN FOR INDUSTRY

IN AN industry as relatively young as refrigeration, any firm marking its 20th year in that field is worthy of note. Heading now into its 20th year of continuous and uninterrupted service for and to the refrigeration industry is Utilities Engineering Institute of Chicago, many of whose graduates are doing admirable service in the field today.

Utilities Engineering Institute — known familiarly in the field as U.E.I.—goes into its 20th year a far different organization from the one which modestly opened its doors to trainees for the first time in 1927. Today it is located in a 24,000 square foot building group at Belden and Wayne Avenues in Chicago, offering a variety of training programs—each designed to meet a particular need, on a national scope.

Since its founding, it has successively outgrown quarters four times. Correspondingly, its scope of service has widened and curriculums have enlarged. But unchanged in any way is the overall guiding policy which was first laid down when the school was opened. That policy is simple and straightforward:

"The aim of this school is to help men train in the fundamentals of refrigeration —to help them secure service, installation, and repairing knowledge which will serve them in whatever branch of the field they find opportunity to use it to best advantage."

The history of U.E.I. is the story of how that policy has been put into practice year after year. And the story begins—strangely enough—not in 1927, when U.E.I. itself was founded, but in the early '80's of the last century. If you know your history of refrigeration, you'll recognize that it was during the two decades before the turn of the century that mechanical refrigeration became a workable and practical reality. It was costly and clumsy (compared to modern equipment) and its biggest use was among brewers and manufacturers of artificial ice.

Utilities Engineering Institute itself came into being—with its present president, E. P. Sorensen, as one of the principal founders—when the use of mechanical refrigeration began to spread from its previous narrow limits. The American housewife, the corner grocer, the butcher, were beginning to ask for a form of refrigeration suitable for their use. And the American manufacturer answered the call by putting onto the market the first domestic and commercial sized units. But when he converted the big, clumsy icemakers into compact, neatly designed small units, the American manufacturer switched from the use of high-pressure to low-pressure refrigerants. Almost at once, there developed a need for refrigeration servicemen —men who knew the answers on the low-pressure cycle jobs.

It was this need that sparked the founding of U.E.I. Mr. Sorensen with his associates turned to the business of developing training which would help a man learn the service, installation, and repair business. It was—and is—training designed not to take the place of actual experience, but rather to give a man the practical knowledge which helps him put his experience to work.

Left: Utilities Engineering Institute, of which E. P. Sorensen and W. H. Hoehne are, respectively, President and Vice President. Right: A view of the Modern U.E.I. shop.

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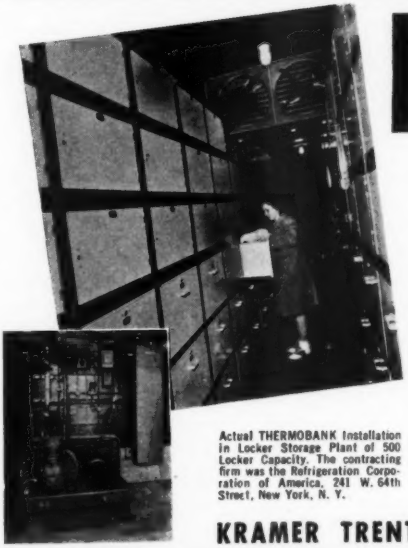

Actual THERMOBANK Installation in Locker Storage Plant of 500 Locker Capacity. The contracting firm was the Refrigeration Corporation of America, 241 W. 64th Street, New York, N. Y.

THERMOBANK

by KRAMER

WITH the THERMOBANK a zero degree system is just as automatic as a 40 degree system—in fact more so.

It never needs to be defrosted because it defrosts itself automatically without the use of brine sprays, water sprays or electric sprayers.

Write for Bulletin TV 345-RS

KRAMER TRENTON CO. *Trenton, New Jersey*

With this year, Utilities Engineering Institute rounds out nearly a full fifth of a century as a part of the refrigeration industry. As it swings into the postwar period, with its promise for industry expansion, the usual physical changes are taking place at U.E.I. New equipment is being added, manuals and texts are being revised, new instruction procedures are being incorporated. Instruction facilities are being augmented.

S S S

IHC PURCHASES EVANSVILLE PLANT FOR REFRIGERATION

INTERNATIONAL Harvester Co. has purchased a former Republic Aviation Corp. plant near Evansville, Ind., from the government for $5,648,000.

E. F. Schneider, general manager of the Harvester Co.'s refrigeration division, said the plant, used during the war for navy airplane manufacture, would be converted for refrigeration equipment production by late summer and eventually would employ 3,500 men.

About 75 executives and other personnel of the division will move to Evansville, Schneider said.

S S S

W. C. MAYFIELD RETURNS TO KELVINATOR

AFTER 40 months in the armed services, William C. Mayfield has rejoined the Kelvinator Division and has been appointed sales engineer in the contract sales department, T. A. Farrell, assistant general sales manager, announced today.

W. C. MAYFIELD

Mayfield joined Kelvinator in 1936 as commercial district representative in Cincinnati, covering several midwestern states. He became commercial district manager in 1940, holding that post until entering the U. S. Army in September, 1942. Serving most of the period as a warrant officer charged with administration and liaison work, Mayfield was in the Pacific theatre for 36 months.

PENN ELECTRIC ORGANIZES NEW CANADIAN COMPANY

A NEW Canadian company—Penn Controls, Ltd.—has been formed to manufacture and sell automatic controls for heating, refrigeration, pump and air compressor applications as well as safety controls for engines, according to Albert Penn, president of Penn Electric Switch Co. of Goshen, Ind. The factory and sales office of Penn Controls, Ltd., are located at 284 King St., W., Toronto 2B, Canada.

A. H. HILLS

"This is but another step in the company's expansion program which started approximately two years ago. Anticipated market activity plus a desire to give better service to the company's Canadian customers prompted the organization of this company," stated Mr. Penn.

Arthur H. Hills, well-known Canadian engineer and sales executive, has been appointed to manage this phase of the company's operations in Canada. Before joining Penn, Mr. Hills was in full charge of manufacturing and sales for Sarco (Canada) Ltd., during the past eleven years. Previously, he was associated for fourteen years with C. A. Dunham Co., Ltd., where he specialized in heating and ventilating.

In selecting Mr. Hills as manager of Penn Controls, Ltd., the company acquired the services of a man who is well-versed in engineering, manufacturing and sales work.

Previous to organizing its own Canadian company, the products of Penn Electric Switch Co. were sold and serviced for the past 8 years through Powerlite Devices, Ltd., Toronto, Canada.

S S S

AVCO ENTERS FREEZER UNIT FIELD

THE Aviation Corporation has acquired a 40 percent interest in Frozen Food Products, Inc., a company recently organized by interests close to Lehman Bros. to carry out plans for the design and distribution of home freezing units for frozen foods,

Did you say— No Refrigeration on a Meter-Miser

Are you prepared to give prompt and efficient service when the original refrigerant has leaked out?

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More and more service men are finding this gas measures up to their expectation for performance in Meter-Misers. Customer satisfaction has also been proven when HERVEEN replaces the original charge.

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is the refrigeration and air conditioning training which has been proving its value for the past 19 years. To men who know or even suspect they are at present headed for a dead end, using the coupon below represents Step No. ONE in a new direction.

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it was announced today by Victor Emanuel, chairman of the board of Avco.

Avco has a contract for the exclusive production of the new company's three-1oot home freezing units, Mr. Emanuel said. The units will be manufactured in one of the plants of the Avco group of companies.

The expansion is a part of The Aviation Corporation's postwar diversification program, which has included an expanded position in the home appliance field through acquisition of controlling interest of the Crosley Corporation, and entry into the farm implement field through purchase of control of New Idea, Inc.

LEONARD WRIGHT, JR., TO REPRESENT ALCO IN SOUTH

LEONARD K. WRIGHT, JR., of Knoxville, Tenn., retiring from the U. S. Army Air Forces as a captain after three and a half years of service, will represent the Alco Valve Company, St. Louis manufacturers of automatic refrigerant control devices, as field engineer in the southeastern territory, beginning January 15.

L. K. WRIGHT, JR.

Mr. Wright attended the University of Tennessee and in 1940 joined the Ansul Chemical Co., refrigerant manufacturers. He was district manager for Ansul in Des Moines, Iowa, when he entered the Army in April, 1942. He served as a pilot in the heavy bombardment group, flying 40 missions in the Pacific Theater, and returning to the inactive reserve in December, 1945.

He succeeds John B. Meyer in this Alco territory and will have offices at 508 Burwell Bldg., Knoxville.

HONEYWELL CREATES NEW RESEARCH POST

APPOINTMENT of Dr. Waldo H. Kliever to the newly created post of director of research has been announced by the Minneapolis-Honeywell Regulator Company, W. J. McGoldrick, vice president in charge of engineering, said here today.

The new director will co-ordinate research activities in all Honeywell divisions in Minneapolis, he said, and in addition will instigate new research projects in the field of automatic control devices ranging from aircraft and railroads to heating and air-conditioning.

Joining Minneapolis-Honeywell in June, 1940, Dr. Kliever was assigned to the engineering department and a year later was made chief physicist for the newly formed Aeronautical division. During the war Dr. Kliever devoted his full time to the development of a number of aeronautical control devices, many of which were of a highly secret nature. Under his direction an electronic fuel measuring system was developed which reduced reading error to two per cent compared with a 15 per cent error in all previous means of fuel measurement. He also did much experimental work in connection with various types of navigational and bombing computors for through the clouds, radar bombing, and for the recently revealed Castor project wherein bombers loaded with explosives were remotely flown into enemy installations. Other devices on which he has worked include blind landing controls, a new electronic compass for aircraft and the design and balancing of gyroscopes.

FLOYD DUVALL NOW ANSUL DISTRICT MANAGER AT INDIANAPOLIS

FLOYD M. DUVALL, who became manager of the Chicago Dugas office for Ansul Chemical Company, Marinette, Wis., in June 1944, and prior to that time was a member of the company's Paoli, Pa., office staff, is the new district office manager for Ansul refrigerants at Indianapolis. The transfer took effect January 1.

F. M. DUVALL

Duvall succeeds L. T. Plouff, who has been advanced to assistant sales manager of Ansul's refrigeration sales department with headquarters at Marinette. The rearranged Indianapolis office territory which Duvall will cover consists of Indiana, Ohio, lower Michigan, Kentucky and Tennessee.

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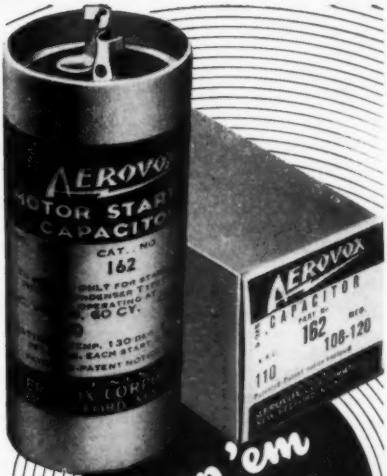

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SCHAEFER STEPS UP PRODUCTION

AN EXTENSIVE plant improvement program to gear production to treble its prewar rate and to double wartime employment levels has been completed by Schaefer, Inc., Minneapolis, Manufacturer of home and farm freezers, frozen food and ice cream cabinets, it was announced Jan. 8 by Harold L. Schaefer, president.

Formed in 1929, the company recently purchased the property at 801 Washington Ave., N., Minneapolis, which it has occupied for the last five years.

It was announced that Schaefer, Inc., has franchised a national merchandising organization with nine district representatives, more than 80 distributors and 5,000 dealers to handle its "Pak-a-Way" home and farm freezers, "Clear-View" frozen food cabinets and Schaefer ice cream cabinets.

We Folks
by HARRY KEYS
THIS IS ANOTHER STORY ABOUT A CONTRIBUTION TO THE WAR EFFORT BY A COLUMBUS COMPANY THAT WAS A MILITARY SECRET UNTIL V-J DAY - IT'S ABOUT THE SPERRY-M I T MARK 14 GYROSCOPIC NAVAL GUNSIGHT THE RANCO COMPANY ON WEST FIFTH AVENUE PERFECTED A THERMOSTAT WITH AN ACCURACY WITHIN ONE DEGREE FROM 20 BELOW TO 180 ABOVE ZERO THAT WAS INCORPORATED IN THE SIGHT
THE NEED WAS GREAT THE LESSON OF THE REPULSE AND THE SINKING OF WALES TWO FORMIDABLE WARSHIPS OF THE BRITISH NAVY WAS APPALLING WITH WAR HUNG BY JAP PLANES A NEW WEAPON AT SUNSHIP MUST BE CREATED IN A HURRY DR C STARK DRAPER M I T LAUNCHES STUDY ON GYROSCOPES FOUND THAT A THERMOSTAT CONTROL WAS NEEDED A THERMOSTAT COMPANY WAS BROUGHT INTO THE PICTURE
THE GUNSIGHT WAS TRIED OUT FIRST ON THE BATTLESHIP X IT WAS ATTACKED BY THIRTY-THREE JAP PLANES - THIRTY-TWO WERE SHOT DOWN AND ONE LEFT HURRIEDLY FOR HOME
AMONG OTHER THINGS THAT THE RANCO CO MADE FOR THE GOVERNMENT WERE 286,000 BINOCULARS AND 60,000 PRESSURE GAUGES FOR AIRPLANES
THE RANCO CO WAS STARTED IN 1933 BY E C RANEY AND ONE EMPLOYE IN A ROOM OVER A GARAGE
RECONVERSION IS CALLING FOR MASS PRODUCTION IN REFRIGERATION THERMOSTAT CONTROLS TWO MILLION WERE PRODUCED IN 1941 MANY AUTO HEATERS ARE ALSO CONTROLLED BY RANCO THERMOSTATS

If you want your new items to reach print in the daily papers they must be made interesting and newsworthy. Telling the story of Ranco Company's activity during the war the above illustrated story is one way of appealing to public interest. It originally appeared in a Columbus newspaper.

REFRIGERATION DIVISION AT MILLS APPOINTS NEW MANAGER

HARRISON J. HEDRICK, who served for 2 years as a Commodity Specialist with the Commercial Refrigeration and Air Conditioning Section of the Office of Price Administration, Washington, D. C., and formerly Assistant Sales Manager of the Refrigeration Division of Mills Industries, Incorporated, Chicago, has been appointed Manager of the Division by Gordon B. Mills, Vice-President in Charge of Sales.

H. J. HENDRICK

Prior to his association with Mills, Hedrick, who is not new in refrigeration circles, was for ten years President and General Manager of Jewett Refrigerator Co., Buffalo, N. Y. In 1931 he joined the Commercial Refrigeration division of R. Cooper, Jr., and it is this position he left to join Mills Industries in 1941. He assumed his position with the Office of Price Administration in 1942 and returned to Mills in 1943.

Hedrick sees an almost unlimited future in the scope of refrigeration, principally in air conditioning, and looks to the larger cities to lead the way in its restaurants and similar public stores and places of business.

His position at Mills Industries, Incorporated, places him in complete supervision of design, production and sales of condensing units and allied equipment.

LIQUID CARBONIC ANNOUNCES 8½ MILLION EXPANSION PROGRAM

AN $8,500,000 expansion program for the Liquid Carbonic Corporation has been announced by P. F. Lavedan, president.

Included in the program, part of which is already under way, is a $1,000,000 soda fountain factory and office building and an $800,000 ice cream cabinet and refrigerator plant.

The new soda fountain building is now under construction on a 4¼-acre site adjacent to Liquid's 23-acre factory and main office in Chicago.

In the new fountain factory Liquid will manufacture its complete line of soda fountain and luncheonette equipment. The line

REPAIR AND SERVICE REFRIGERATORS—

— WIRING
— COPPER TUBING
— ELECTRODES, ETC.

with

IDEAL "THERMO-GRIP"
Electrically Operated
SOLDERING TOOLS

More and more refrigerator repair men are turning out top servicing jobs with these versatile soldering tools, that are more than just ordinary soldering irons — they are handy electrical soldering tools designed to handle hard and soft soldering — soldering terminals, lugs, delicate wiring, spot soldering, soldering copper tubing. Ideal for working in close quarters. IDEAL "Thermo-Grips" do a better job—quicker! The part touched heats almost instantly. Safe—no pre-heating or open flame hazard.

Wide variety of attachments to choose from, for every kind of soldering work.

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Kold-Hold Manufacturing Co., of Lansing, Michigan, manufacturers of "hold-over" truck refrigeration and plate type evaporators, had just concluded a successful get together with field representatives, at Hotel Olds, Lansing, when this picture was taken. Standing (left to right): C. H. Reynolds, C. K. Davis, F. E. Heidrich, J. R. Tranter. Seated: R. D. Spitler, H. C. Hoover, E. A. Thiele, T. O. Lester, L. R. Burr, A. L. Golay, J. C. Jackson. In attendance at the get together but not in picture were: L. F. Young, Leo. J. Freitas, H. S. Ryan and Pacific Kold-Hold representatives.

includes Coldsleeve fountain units, complete fountains, and a full line of equipment.

The new plant is designed for a substantial increase in production of fountain-luncheonette equipment to satisfy the huge peacetime demand for such equipment.

In the meantime, Liquid fountain production is at full capacity in its present plant.

The company's new plant at Morrison, Illinois, occupying a 7-acre site, will produce Liquid Red Diamond ice cream cabinets, which are now being manufactured at Galesburg, Illinois. The Morrison plant also will produce Liquid's entry into the home refrigerator field, the Frostor.

This will include two units, a combination refrigerator and frozen food unit and an entire unit for freezing and storage of frozen foods. It will be retailed by General Tire and Rubber Company, Akron, Ohio.

Other portions of Liquid's expansion program include an estimated 50% production increase in its machinery division capacity for manufacturing bottlers' and brewers' machinery. Other additions are seven new carbon dioxide plants in the U.S. and Central and South America; new soda fountain factory and gas plant in Montreal, Canada, and a new office, showroom and service building in Long Island City, New York.

W. J. McCOY, KNOXVILLE DISTRICT MANAGER FOR BURGE

WILLIAM J. McCOY was recently appointed District Manager of the Knoxville office for the Burge Ice Machine Co., Holyoke, Mass.

Formerly associated with the Worthington Pump and Machinery Co. at Holyoke, Mr. McCoy assumes his new position with considerable knowledge and acquaintanceship in the refrigeration field. He is a member-at-large of R.S.E.S. and took an active interest in Society affairs in Massachusetts.

HEAT-X-CHANGER CO. MAKING DELIVERIES

ANNOUNCEMENT is made by Cecil Boling, of New York City, that he has completed all plans for the manufacture of a cast aluminum liquid cooling lowside, and that he has organized The Heat-X-Changer Co., Inc., about which the industry has already heard. The company has built its own plant at Brewster, New York, on a large parcel of land purchased from the New York, New Haven and Hartford Railroad Company. Tooling has been finished,

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LEAD SEAL JOINT SEALING AND ANTI-SEIZE PIPE JOINT COMPOUND

'BESTOLIFE has been used successfully in the Refrigeration Industry for years.

'BESTOLIFE is non-corrosive and non-expanding. It takes the place of litharge and glycerine. Does not harden or dry out. Protects threads, keeps pipe joints tight yet easily broken apart.

Prove 'BESTOLIFE'S efficiency for yourself. Trial 1¼ pound can sent anywhere in the U. S. for $1.00. This charge cancelled if not entirely satisfactory.

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FOR 1946

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THE HARRY ALTER CO.

1728 S. Michigan Ave. Chicago, Ill.

Two Big Warehouses to Serve You

134 Lafayette St. New York, N. Y.

production is under way and deliveries are being made at an ever-increasing rate.

Production and management of The Heat-X-Changer Co. factory is being handled by Robert J. Alcorn, Executive Vice President. Bob resigned from Universal Cooler Corporation, with whom he had been associated the past several years, as of January 1.

The Heat-X Cast Aluminum lowside is interesting. According to Boling's claims, its advantages are: no freeze-up damage, no short cycling, small refrigerant charge, highly efficient, low initial cost and long life. A number of leading manufacturers have tested the lowside, he reports, and orders indicate a ready acceptance.

In addition to the liquid cooling lowside, The Heat-X-Changer Co. has taken over the manufacture of heavy duty floor type unit coolers, previously made by The Bush Manufacturing Company. On these units, Bush supplies the coils, which are installed in a line of standardized and streamlined sectional casings designed by Cecil Boling Company.

GE NAMES TEN DISTRICT MANAGERS FOR AIR CONDITIONING

TEN District Managers have been named to head the sales organizations of the General Electric Company's Air Conditioning Department throughout the country, the new appointments marking the inception of a revised organization of the Department's field staff, according to an announcement today by J. P. McIlhenny, Manager of Sales. The new appointment became effective January 2.

To accommodate expanding activities of the air conditioning department, the General Electric Company has divided the country into ten districts, each district having a manager to head the sales activities of field engineers and representatives.

The new district managers are: R. S. Thurston with headquarters in Boston, New England district; L. T. Brockbank with headquarters in New York, New York district; C. S. Morash with headquarters in Philadelphia, Atlantic district; G. B. Hightower with headquarters in Atlanta, Southeastern district; J. F. Murphy with headquarters in Cleveland, East Central district; J. F. Carland with headquarters in Chicago, North Central district; J. P. Turner with headquarters in Kansas City, Central district; V. L. Strange with headquarters in Dallas, Southwestern district; E. H. Howes with headquarters in San Francisco, Pacific district; W. H. Stover with headquarters in Portland, Northwestern district.

All of the new district managers have long records of service with the General Electric Company and have gained wide recognition throughout the field of refrigeration and air conditioning engineering.

GEORGE BOEPPLE BACK WITH ALCO FROM NAVY

AFTER four and a half years in the U. S. Navy, where he rose to the rank of Lieutenant Commander, George J. Boepple has returned to the field engineering force of the Alco Valve Co., St. Louis manufacturers of automatic refrigerant controls, to take over the Philadelphia office.

G. J. BOEPPLE

Mr. Boepple received a degree in engineering chemistry at Washington University, and joined the Alco engineering staff in 1936 after working for two years as an apprentice brewmaster at the Anheuser-Busch Brewing Co. He later became manager of the Alco service department and was transferred in 1938 to the New York office as a field engineer.

Mr. Boepple's naval service began in June, 1941, as a Lieutenant (j.g.). He was promoted to lieutenant and lieutenant commander at about one-year intervals, and returned to inactive duty in October last year. He served successively as an assistant machinery superintendent at the Brooklyn Navy Yard, on the staff of the Pacific Fleet maintenance officer, and in the planning section, on logistics, of the staff of Admiral Nimitz.

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plies Co., Ltd., today reported net profit for year ended September 30 of $158,578. This was after provision for taxes on profits out of income.

After the payment of dividends of $100,000 the net working capital stood at $1,277,460 as compared with $571,565 the previous year end. The working capital was by far the largest in the company's history and, the report said, was adequate to permit a substantial expansion in Canadian activities. Reconversion of the company's premises was reported almost finished and deliveries of post-war products had started.

Net profit for the year ended September 30, 1944, was $202,391. During the year just reported gross profit from operations was $482,060 against $451,781 the year before. Provision for taxes on income came to $165,600 compared with $132,000 the previous year, provision for contingencies $50,000 compared with $25,000.

Salaries, fees and all other expenses for selling, service and administration totalled $140,914 against $98,036. On September 12, 1945, shareholders approved the sale of capital stock of Kelvinator, Limited, and certain rights in respect to export business to Nash-Kelvinator Corp. for $615,000. The transfer was completed before the close of the fiscal year and liquidity of the company improved.

J. J. DONOVAN NOW SALES MANAGER OF AIRTEMP

ADVANCEMENT of J. J. Donovan, Eastern Divisional Manager, to the post of Assistant General Sales Manager of Airtemp Division, Chrysler Corporation, was announced here today by H. A. Malcom, General Sales Manager.

J. J. DONOVAN

Donovan's transfer to Dayton strengthens the home office staff with additional broad experience in the direction of sales and distribution activities. His original assignment with Airtemp was as Regional Manager in New York, before he became Eastern Divisional Manager.

McQUAY, INC. APPOINTS C. L. BENSON MANAGER

C. L. BENSEN

C. L. BENSEN has been appointed manager of the Refrigeration Division of McQuay, Inc., Mr. R. C. Colman, vice-president and general sales manager, has announced. For the past three years Mr. Bensen has been in charge of the aircraft division of McQuay, Inc., and prior to that time was chief engineer for ten years. He has been with the McQuay organization since 1928 and is thoroughly familiar with its products and potentialities. Mr. Bensen's new duties will be directed toward the establishment of the new jobber policy on refrigeration products. Mr. Bensen is a member of the A.S.H.V.E. and A.S.R.E. and has been quite active in both organizations

DAN ROBERTSON, PRESIDENT OF UNIVERSAL COOLER IN CANADA

DAN ROBERTSON, for the past 16 years Vice President of Universal Cooler Company of Canada, Ltd., was elected President at the annual meeting of the company here January 25. He succeeds F. S. McNeal, who also is General Manager of Universal Cooler Division, Marion, Ohio, and a Vice President of International Detrola Corporation, Detroit, Mich., of which Universal Cooler of Canada is an affiliate.

Howard Gray, for two years Treasurer of the Canadian company, was elected a Vice President in addition to his financial post. Fleming W. Johnson and William A. Alfs, both Vice Presidents of International Detrola, were elected to the board of directors of Universal Cooler of Canada. Other directors are Robertson, McNeal, W. S. Ewens, Toronto; W. R. Newport, Toronto; and E. A. Wilson, Ingersoll, Ont.

Robertson said that the Brantford plant, which during the war manufactured many kinds of munitions, has completed its physical reconversion and is again producing refrigerating and cooling equipment, with expectation of reaching normal output rate in April.

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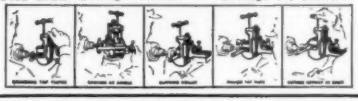

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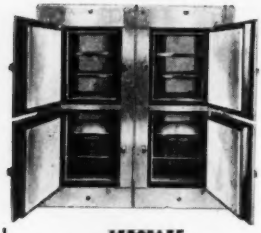

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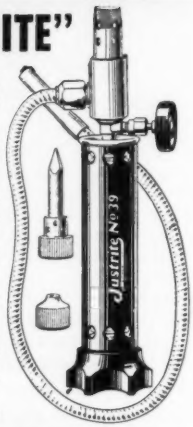

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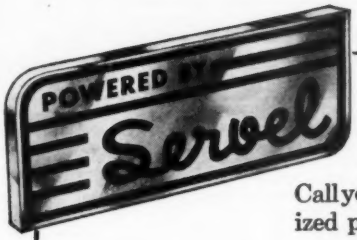

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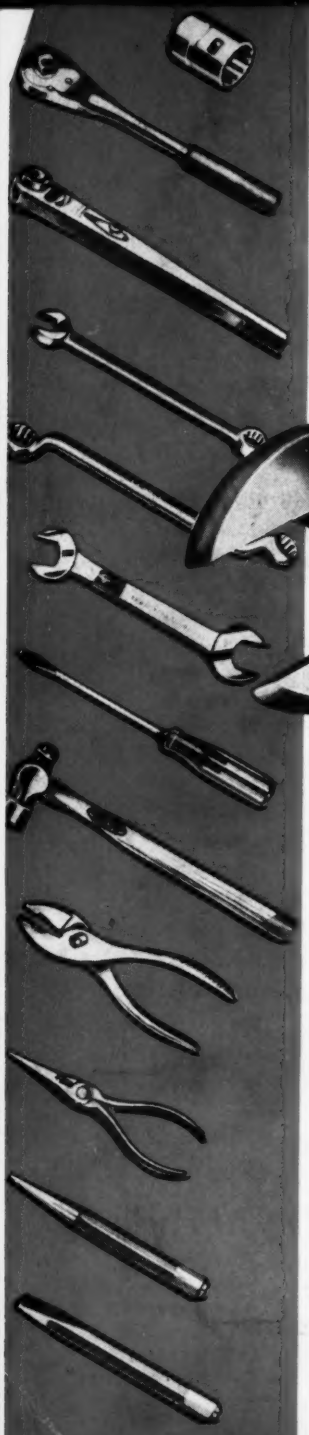

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